June 16, 1958
30 CENTS

Pentagon Problem: Quantity or Quality? p. 17

There's a Fuel Fight Shaping Up p. 36

The Inside Story on the New Aviation Act p. 41

AMERICAN AVIATION

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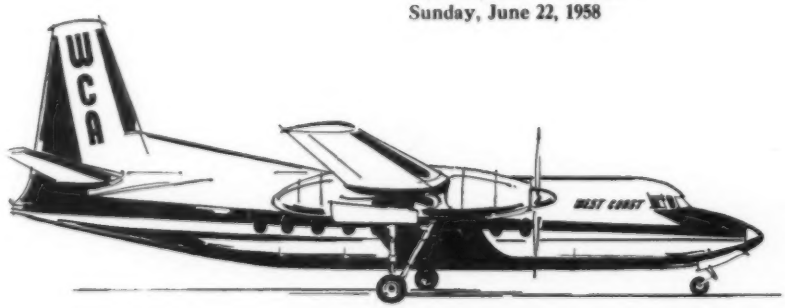

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WORLD'S LARGEST AVIATION PUBLISHERS

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Coming next issue . . . another AMERICAN AVIATION bonus. This will be the most complete directory of business and transport aircraft yet published. Included will be the new, the old, the military conversions and the yet-to-come. There will be more than one hundred pictures and the most complete "specs" available.

The General Motors Matched Power Team of Allison Prop-Jet Engines and Aeroproducts Turbo-Propellers Assures Convair 340/440 Transports Continued Service in Jet-Age Transportation

CONVERSION TRANSFORMS TODAY'S AIRCRAFT INTO JET-AGE TRANSPORTS. Obsolescence facing piston-powered Convair 340/440 transports can be solved by modernizing these popular twin-engine planes to Allison Prop-Jet engines and Aeroproducts Turbo-Propellers. Conversion to Allison Prop-Jet power packages is *economically* and *technically* sound:

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- At maximum gross take-off weight, cruising altitude of 20,000 feet is reached in 13½ minutes; 15,000 feet in only 9 minutes. (Based on Standard Temperature.)

Performance and aircraft power dependability are indisputable. Allison proved these and many other facts during "Operation Hourglass" by flying 1,000 hours in 84 days with only screwdriver-type maintenance. These are the same turbine-propeller power plants selected by leading world airlines to power their Lockheed Electras. And, the U. S. Navy chose Allison Prop-Jet power for its new squadrons of Electra Anti-Submarine Warfare planes.

ALLISON PROP-JET POWER

GM AIRCRAFT POWER

ALLISON DIVISION OF GENERAL MOTORS CORPORATION, Indianapolis 6, Indiana

Rushing the FAA

The timetable for a new Federal Aviation Agency has been moved up almost a year following the latest mid-air collisions. While Presidential Aide Elwood Quesada was working toward a schedule of drafting legislation to present to Congress by next Jan. 15, Senator Mike Monroney, the Oklahoma Democrat, decided to rush ahead with his own bill calling for a similar agency.

If the Monroney bill gets through both Senate and House at the current session it will set something of a record for speed. Yet the prospects of passage are quite good despite the slowness of Representative Oren Harris in the House to move along on his side. There is no discounting the eagerness of Congress to do something fast about air traffic control.

Senator Monroney, being a firm friend of aviation, is quite knowledgeable on the subject. Yet there are several major differences of opinion within government and industry on several features of his bill.

One area of disagreement is whether a single agency should be law-maker, policeman and judge. The bill would take law-making and judging from CAB and move it into the new agency, which would absorb all of the present CAA enforcement activities. CAB strongly opposes the transfer. So do many others. We think the Senator should listen carefully to all of the arguments before he commits himself definitely to making the FAA all-powerful in all respects. It is not without reason that law-making, enforcement and the judiciary are kept separate in U.S. government.

Then there is doubt about the military, especially USAF. Opposition to melding its interests with civilian control is not as strong in USAF as it was several years ago, but USAF might as well accept the inevitable that air traffic control must be under single direction. The problem then arises as to who is going to do the directing—civil or military. We think the military should be well represented but we hope the top director will be civilian. But in neither case do we think the fears being expressed on this point by many are really important. The goal is unified air traffic control and, if all elements are represented in the directorate, the minor hassles can be worked out.

On the whole the Monroney bill is a good one and merits prompt support by all elements of aviation.

Small Business Is Hurting

The handling of contract terminations and changes in procurement rules by the Defense Department has hit small contractors very hard.

Small companies have been forced out of business by the government's refusal to pay their contract termination claims. More are near to closing up. Believe it or not, but these unpaid claims currently total more than *$6 billion.*

Congress needs to give far more attention to this critical problem than it has so far. Repayment of this $6 billion would be an excellent antirecession measure. More than that, it would save hundreds of small contractors from extermination.

Termination claims have been mishandled a long time. Action by Congress could perform two vital services:

1. Set up a temporary Contract Settlement Board (similar to that established after World War II), *manned by civilians,* to clear and *pay* all Government contract claims within 90 days. And to force prime contractors to pay their subcontractors' claims.

2. Revise the regulations by law: (A) setting a time limit for payment, of say 60 days from receipt of claim; (B) withholding payment of prime contractor's claim until he has paid his subcontractors' claims; (C) putting back into law the requirement of payment of 6% interest on both prime and subcontractor claims, from cancellation date until paid. (Without this interest penalty, there is no incentive for the government to settle claims promptly.)

Small business was invited and encouraged to participate in the defense program. It was encouraged to develop facilities. The compensation for this participation has been a kick in the teeth. How can any business survive when it can't get paid? It is a national disgrace to have $6 billion in unpaid claims. No wonder there are bankruptcies and a recession.

Bouquet to Allison

When Lockheed Aircraft undertook to design and build the turboprop Electra transport, there was no suitable U.S. propjet engine available. The success or failure of the Electra program hinged on a reliable engine that could be developed and tested soon enough for delivery schedules.

Allison Division of General Motors stepped forward with an engine which it had been working on for the military with indifferent results. But top General Motors officials gave firm assurances. They promised the moon. At the time the orders were let there was no lack of skepticism that Allison could get the job done. There was no question about Allison's competence but there were feelings that maybe the parent company didn't know how much it had committed and wouldn't provide the necessary resources.

It is a pleasure to hand a bouquet to GM and Allison for a commendable achievement in fulfilling the promises. There is nothing but praise today for the Model 501 D13 propjet engines and Aeroproducts 606 turbo-propellers which are going on the Electra for delivery this year. Allison's Operation Hourglass, a 1,000-mile flight durability demonstration, was an unqualified success. The U.S. will possess a few months from now not only the finest turboprop airplane in its class, but the first reliable 100% U.S. propjet engines to power it. GM said it would be done—and it was done.

Wayne W. Parrish

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SPOTLIGHT

Plans are for North American's X-15 rocket plane to be carried aloft under the wing of a B-52 rather than in the bomb bay, as the X-1s and X-2s were carried by B-29s. The X-15 is to be slung under a pylon jutting from the underside of the starboard wing between the fuselage and the inboard nacelle.

North American's delta wing B-70 bomber will incorporate electronic gear packaging which will enable quick inflight repairs to be made by substituting packages.

Douglas Aircraft Co. delivers the 1,000th plane in its DC-6/7 line this month. It's a DC-7 for United Air Lines.

At least two advanced versions of the F-106, long-range, all-weather interceptor are at the proposal stage at Convair. One is a Mach 3 version of the aircraft with the new Pratt & Whitney J-58 engines. The second is a Mach 4 proposal in which Convair would use ramjets.

There are three interchangeable pods which can be used on the B-58 Hustler. The recently declassified third pod is for data reconnaissance. Details are classified but the understanding is that the pod is instrumented to provide weather and other information which would normally be sent back by a reconnaissance-type aircraft. Other pods are the weapon pod and the photo reconnaissance pod. Net effect of the development is to provide the Mach 2 bomber with a versatility almost as great as a fighter plane.

Now that tests of the F-102 are completed, Convair at Fort Worth is ripping the instrumentation out of the test models and converting them to tactical aircraft. By so doing the Air Force is hoping to increase the available number of planes for tactical units.

F-100s are being used to demonstrate problems of weightlessness which the Air Force expects to encounter when pilots head for outer space. Tests have gone so well that a few selected correspondents have been given test flights to show what the problem is.

Cessna Aircraft has developed a retractable landing gear for its Model 182. Main gear is said to turn 45 degrees, retract backward into fuselage. New version is called Model 185.

Anderson Greenwood & Co., Houston, who several years ago produced the AG-14 twin-boom pusher lightplane, has developed a new lightweight Mach .85 aerial target which is being evaluated by Navy for antiaircraft practice.

Helium is in short supply and military contractors who use the gas in their development programs are looking for new sources of "lift." This is particularly a problem with manufacturers of various types of balloons used for weather observation purposes.

Gross weight of the new Boeing B-52G "wet wing" jet bomber is rated at nearly 50,000 lbs. over previous versions, yet requires no more runway and climbs higher and faster than the B-52E. Range is said to be over 9,000 miles without refueling. First "G" will roll out at Wichita about July 15.

Tire manufacturers are looking for better materials than rubber and nylon to meet demands for up to 615-psi pressures and new requirements for tires that will withstand 800°F.

The first approved oils for jet age airlines

A new era in aviation is unfolding—turbo-jet airliners are joining our commercial airline routes. Esso is especially proud that its Turbo Oil 15 was the *first* to be approved for use in the new Pratt & Whitney jet engines . . . and that Esso Turbo Oil 35 was the *first* to be approved for the new Allison Turbo-prop engines.

A decade ago, Esso Research anticipated the need for a new synthetic lubricant for aircraft turbine engines. Working with American and British designers and manufacturers, Esso Turbo Oils 15 and 35 were developed. Because these synthetic lubricants were used by manufacturers of jet engines in the development and testing of these new engines, they are thoroughly time tested and performance proved.

Esso Turbo Oils 15 and 35 were the *first* turbo oils to be approved by manufacturers of the following commercial turbo-jet and turbo-prop engines:

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Rolls Royce Conway.....Boeing 707 • Douglas DC-8

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540 TURBO-PROP

These facts merit study:

- By special arrangement, Convair has transferred to Canadair all "440" tooling to start new "540" production line.
- Seat mile cost of 1.3 to 1.5 cents.
- Low operating costs make it profitable on moderate density routes . . . has 8% more seats than "440's" in standard configuration.
- Operational flexibility: uses any moderate size airport . . . has a range of 1500 miles with 2 hrs. fuel reserves . . . climbs quickly (1400 fpm) to smooth cruise altitudes of 15-20,000 ft.
- "Eland-6" engines provide wide speed range . . . overhauls at long periods . . . sectionalized design for easier maintenance. Each engine develops 3500 eshp at take-off, allowing increase of 4100 lbs. over "440" in max gross weight. Cruise speed 325 mph at 20,000 ft.
- Aircraft is in production for the Royal Canadian Air Force . . . first deliveries, July, 1959.

The turbine-powered Canadair "540" is the newest development in a series of great aircraft—the Convair "240's", "340's" and "440's"—aircraft that have already accumulated some 6,000,000 hours of world-wide operating experience—aircraft that have proved themselves to be unmatched in their flight range for speed, efficiency and economy of operation.

With Napier Eland turbine power added, the Canadair "540" has the increased range, speed and payload that identify it as the *great new challenger* on short and medium range routes.

The result is a new airliner unsurpassed in performance characteristics and earning power.

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—AIRTRENDS—

Probers of the Hebert Armed Services Investigation Subcommittee are taking a different tack, but don't look for any public announcement. Three regular staff members have departed and will not be replaced.

But this signals no let-up of investigations into military matters, sources maintain. Subcommittee has hired six investigators on a contract basis. They're already scanning certain defense activities.

Aircraft that "are just ground transportation designed to avoid obstacles" are being sought by the Army, which is evaluating a number of VTOL/STOL projects. Army wants a low-flying aircraft that can take off and land vertically in selected, unprepared areas.

Need for more work in the field of high temperature materials finally is being recognized. More money will be made available both by the Congress and the Pentagon for work in the field which vitally affects missile and aircraft propulsion, atomic and thermonuclear energy and aerodynamic heating.

Final report on the collision of an Air National Guard T-33 and a Capital Airliner may show that the Viscount hit the jet trainer. Air Force is beginning to fight the charges that current rash of "near misses" are sole responsibility of military. At the same time, net effect of collisions and current safety concerns is to hasten military cooperation with safety efforts.

Hopefully, the Air Force expects the Congress to restore the funds for the UCX small jet transport before the Defense Appropriations Act is finally enacted into law. About $20 million is involved in the first year's program.

Navy's money problems are indicated by the decision to eliminate $490 million in shipbuilding from the fiscal 1958 program. One of the items slated to be abandoned is the project to convert the aircraft carrier Block Island to an assault carrier for the Marines. The action which involves a saving of some $30 million probably means that the Marines' concept of vertical envelopment with the use of helicopters for landing parties will again be delayed. Navy, however, hopes to get the Congress to restore funds for advanced components for its second atomic aircraft carrier.

Big question is whether "rigid" expenditure ceilings will again be clamped on the Army, Navy and Air Force with the debt ceiling slipping back to $275 billion on June 30 and an expected deficit of at least $3 billion, and the prospects of a $13 billion deficit in fiscal 1959. DOD is now spending at an annual rate of about $42 billion for military functions only.

Overhaul of Defense procurement policies is proceeding at a snail's pace as the Pentagon tries to obtain industry agreement on allowable costs. Divergence of opinions and philosophy is so great that chances of an agreement are almost nil—unless an airing of all the issues first takes place on Capitol Hill. Chances of such an airing are negligible, so that the operation might almost be termed "Operation Stalemate."

Pentagon is moving cautiously in the reorganization of information and liaison acitivities. Idea is to first create a joint planning office. Fear is that advocates of freedom of information will take the case to Capitol Hill if a reorganization is fully implemented before Congress goes home. Indications are that if present plans carry, information services will be so bogged down in red tape as to make the job of communications with the public and the Congress virtually impossible.

INDUSTRY At Deadline

Is Renegotiation a Must?

Industry pressures are building up for a thorough look at the need for an extension of the Renegotiation Act, or alternately, for the development of a formula that would restore incentives to cut costs on government contracts. It is almost certain that there will be hearings before Congress acts on the requested extension this year.

In the forefront of the fight is Aircraft Industries Association which has taken the position that other forms of contracting now available to the Pentagon can assure the government of fair and reasonable prices for defense products. However, AIA recognizes the political niceties of the situation when the Renegotiation Board claims that it has been able to effect the return of $100 million over a period of four years.

As a result AIA recommends that the law be amended to make it clear that contractors ought not be deprived of profits resulting from efficient production.

National Security Industry Association is joining the fight over the provisions of the Renegotiations Act. Like AIA, the NSIA takes the position that the Act:

Stifles efficient, low cost operation;

Is currently at cross purposes with Defense Department procurement policies which seemingly aim at cost cutting;

Fails to provide specialists with special recognition; and, discourages small business.

One of the major problems cited by both groups is the failure of negotiators to agree on what constitutes an "excessive" profit with the end result that funds must be tied up until the slow moving board in Washington finally makes its decision.

Perhaps the strongest advocate for doing something about the Renegotiation Act is small business. The telling argument is made by the Strategic Industries Association that the smaller, specialty companies who manage to stay in business largely because of "know-how" and "efficiency" are being penalized by the decisions of the Renegotiation Board.

One of the major reasons for the current concern was the so-called "Boeing decision" in which the Renegotiation Board found that the big aircraft manufacturer must make a $10 million refund because its profit on invested capital was too high since the company used Government facilities, relied to a large extent on debt capital and progress payments and permitted much of the work to be done by subcontractors.

Small business points in confusion to the statement in the current law which requires, in effect, that the extent of subcontracting must be considered in determining excessive profits. How this factor was to be considered was not explained or understood before the Boeing decision.

Answers aren't available at this time. However, the signs point to the fact that Congress will take another look at the law which was originally a World War II statute.

To See and Be Seen

Air Force seeks brighter marking for its aircraft

A new effort is being made by the Air Force to help avoid the danger of mid-air collisions by improving the marking of USAF aircraft. As a priority, Air Research and Development Command has been asked to develop a standard "maximum conspicuity marking pattern of luminescent retro-reflective paint and/or pressure-sensitive tape materials for all types of aircraft and helicopters."

Use of the material, when developed, would be required for all aircraft and helicopters including combat types involved in training, test, search and related support missions.

Guide-lines and objectives include the following: (1) maximum conspicuity marking pattern under minimum daylight visual conditions using luminescent retro-reflective materials; (2) minimum overall initial and recurring maintenance costs; (3) minimum interference with aerodynamic characteristics including minimum weight penalty under all flight and climatic conditions; (4) no detrimental optical effects from close association to other aircraft under all ground and flight conditions.

An Air Force standard marking color and material for each type of aircraft and helicopter would be developed under the order in place of special purpose markings now used. Aim in developing the standard is economy.

The color to be used in the luminescent retro-reflective material is called "international orange." Initial radiant energy factor required should be at least 175% of that obtained from the use of magnesium carbonate block as 100% standard. ARDC will furnish the standard marking patterns and material specifications to the Air Materiel Command on a priority basis.

Air Materiel Command, in turn, has been ordered to expedite procurement as soon as configuration markings become available and material specifications are defined. It has also been asked to determine the results of a test marking program which has been under study by the Air Training Command for the last 18 months.

USAF Takes Seven Steps to Prevent Collisions

The Air Force has taken a number of definite steps to avoid such ghastly mid-air collisions as those which occurred during the past two months near Las Vegas, Nev. and Brunswick, Md. They are:

1. It has banned, with certain exceptions, non-tactical jet flights below 20,000 feet unless the pilots are flying by instrument flight rules.
2. It has banned the use of civil airports by tactical jets, except in emergencies, unless the jets are "tenants" of the base.
3. It has adopted a clear-cut system of reporting near-misses.
4. It is planning the development of brighter, luminescent markings to improve the identification of airplanes.
5. It is turning over to CAA some SAGE (semi-automatic ground equipment) units and radar for air traffic control.
6. It is cooperating in the development of "super skyways" with CAA.
7. It has a project under way to segregate jet trainers from normal traffic in the use of all airspace.

Conferees to Work Out Budget for NACA

A conference committee of House and Senate members was set last week to work out differences in the new budget for the National Advisory Committee for Aeronautics. The Senate okayed funds of $106,320,000 to operate the agency in the next fiscal year.

Senate increases reflected a $5,380,000 boost for salaries and expenses above the House allowance. Senators approved $80.1 million for this NACA account and $26.2 million for construction and equipment.

Reading Air Show

Lighter autopilots, many navaids, radios on display

An estimated 2,500 business aircraft owners, operators and manufacturers attended Reading Aviation Service's ninth annual maintenance and operations meeting at Reading, Pa. June 6-7 and had a good opportunity to examine the latest in navigation and communications equipment as well as the latest business aircraft.

There were 50 booths in the main hangar at Reading Airport. New aircraft manufacturers were well represented, along with suppliers of maintenance equipment and parts. Automatic pilots attracted considerable attention, especially the lighter, less expensive equipment for light twins.

Four makes of automatic pilots were on display. These were manufactured by Tactair Div. of Aircraft Products Co.; Lear, Inc.; Federal Industrial Products Div., International Telephone & Telegraph Corp. and Mitchell Industries. The use of transistors instead of tubes has enabled manufacturers to produce lighter, less expensive autopilots for the smaller business planes.

Prices quoted by two manufacturers ranged from $1,995 for a Beech Bonanza unit by IT & T to $3,285 for a Beech Travel Air 95 unit by Tactair.

Two helicopters, a Bell 47J Ranger and a Republic Alouette were in the air constantly, giving rides to various aviation industry and other company representatives.

Long rows of parked aircraft afforded the crowd an opportunity to inspect the many different types. At the peak there were 225 on display, representing about 68 different types. These ranged from a 1928 Waco 10 bi-plane, powered with a Tank 63 engine, to a plush executive Convair 440 owned by U.S. Industries.

Most popular executive airplane appeared to be the Howard Aero Super Ventura, of which no less than seven were parked on the ramp at one time. It was a Super Ventura owned by U.S. Industries, incidentally, which won the Reading Aviation Service 1958 Flagship award.

Many other converted ex-military types were on display. These included a beautifully finished Douglas B-23, a speedy Douglas B-26B, Grumman Goose and Mallard amphibians, two de Havilland (G.B.) Doves, a Lockheed Lodestar and a McKinnon Hickman conversion of the Grumman Widgeon amphibian.

Also on display were Aero Commanders, Cessna 310s, Beech Super 18s, Beech Twin Bonanzas, a few Beech Travelair 95s and a flock of Piper Apaches, Tripacers, Comanches and Ryan Navions. A few of the lesser known and other older aircraft included a lone Meyers MAC 145, Ryan STA, ex-military North American T-6, a Beech G17S Staggerwing and a brand new single-place aircraft called an HPK SP-1.

The many forums conducted for the business plane operators provided a wide variety of subjects. A discussion of maintenance problems confronting aircraft owners was moderated by George Weitz, deputy chief of the CAA's general safety division.

Defense Cracks Whip to Aid 'Voluntary' Oil Import Plan

The Defense Department is using the petroleum procurement program as a means of supplementing the government's program to reduce importation of foreign crude oil.

Contractors who sell jet fuels and special Navy fuels to the Military petroleum Supply Agency are required under a presidential order to agree that the products be derived from domestic crude or from crude acquired in accordance with the order which cuts back allowable imports of foreign crude from the Middle East, Venezuela and Canada.

Under the terms of the order, import quotas are established for each company on a voluntary basis on the record of imports the preceding year. This means in some cases that companies with little or no record of previous imports are virtually frozen out of the import market.

One case of an alleged violation so far exists. It involves a contract between the Military Petroleum Supply Agency and Eastern States Petroleum & Chemical Co. An agency spokesman said that the bid did not disclose the fact that the company planned to violate import quotas. As a result, the contract was issued. The Defense Department is trying to decide what if anything can be done about it except warn the company not to repeat this practice.

McElroy Asks Restoration Of $380-Million Slash

Senators had before them this week a Defense Department appeal for restoration of $380 million to military aircraft procurement accounts. Defense Secretary Neil McElroy asked the Senate Military Appropriations Subcommittee to overturn House action clamping a 20% cost ratio on aircraft spare parts (See page 27).

In approving a new budget estimate of $38,409,561,000 to run the Defense Department during the next fiscal year, the House also lopped $23,800,000 earmarked for the procurement of executive type aircraft. The reduction is also being appealed.

Of the spare parts squeeze, McElroy said: "We do not believe it is feasible or necessarily desirable to shift abruptly from the ratios in the budget submission—38.6% for the Army, 32.2% for the Navy and 28.8% for the Air Force —to the flat 20% recommended by the House."

Record Budget

Senate Would Give CAA, CAB More Than House

Record new appropriations to run the Civil Aeronautics Administration and the Civil Aeronautics Board next fiscal year were approved last week by the Senate. A routine conference between House and Senate members was called to iron out differences between the amounts approved by the two chambers.

Voicing its desire for early improvement of air navigation facilities, the Senate Appropriations Committee fattened CAA's fiscal 1959 request by $16.5 million—the amount trimmed by the House.

The action pushed the total navaid funds up to $175 million, to finance the next phase of CAA's billion-dollar five-year modernization program. It left the conferees the question of deciding how this extra sum would be applied.

The committee overrode the House on another point, restoring authorization for ten "super-grade" positions to CAA. It endorsed the House allotment of $230 million for operation and regulation. Authorization for the Commerce Department to inaugurate an aviation war-risk insurance program was granted.

The committee was more liberal to CAB, too, reinstating authority for ten super-grades that had been pared by the House. It tacked on an extra $100,000 for CAB salaries and expenses for employment of new workers on route cases. Committee approved $6,100,000 in this category and went along with the House recommendation for $40,750,000 for new subsidy payments.

The Airways Modernization Board, making its first budget appeal before Congress, won full restoration of House reductions of $4,315,000. Total 1959 budget for AMB is $34,315,000.

Meanwhile, the President sent to Congress a supplemental appropriation request of $66,250,000 for the CAA. The bulk of the cash is earmarked for construction of a long-delayed second airport for Washington, D.C. For construction of the new field, featuring

two runways of 11,500 feet and a third of 10,000 feet, the Administration is seeking $53,500,000.

"The terminal area and certain other features of the airport will be designed to meet anticipated needs of 1965," the White House request stated.

The remaining $12,750,000 is sought for CAA to provide recruitment and training of traffic controllers, maintenance technicians and other personnel to man newly installed air traffic control facilities.

In reporting the overall 1959 Commerce Department appropriations, the committee shunned the idea of military financing of navaids. "The committee believes that, since the Civil Aeronautics Administration is responsible for the common civil-military system of aids to air navigation, the funds should be provided in this bill," the report noted. What the restoration of $16.5 million means is that the Senate favors CAA funding rather than relying on the transfer of the like amount from the Air Force.

New funds for both aviation agencies reflect substantial increases over the previous year. Implicit in the liberal congressional action is the belief that the cash can be wisely and quickly spent to accelerate air safety.

Toward Mach 3

High-temperature research to get emphasis and money

Key to the progress towards Mach 3 aircraft and beyond, experts agree, lies in the answers still to be found in the area of high-temperature research. Answers haven't been easy to come by over the past few years because the emphasis has been on progress within the state of the art rather than on research.

However, the picture is now changing. Congress was shocked recently when Dr. Allen Astin, chief of the Bureau of Standards, told the House Appropriations Committee that in the area of high-temperature measurements and instrumentation Soviet Russia was far out in front.

More money is now being provided for work in this area.

The Bureau's program involves viscosity measurements above 2,000°C; high temperature transformations of materials; thermodynamic properties of zirconium hydrides; the properties of materials at high temperatures; Beta-Alumina structures in trivalent systems; and high-temperature phase equilibrium studies.

Meantime, the Defense Department is continuing to work at the problem of developing new materials and new manufacturing processes. Progress has been slow. However, with new direction from the Office of Research Engineering and the chances that the agency will finally have its own money, "prospects are looking up that solid progress can be made in the critical areas," those responsible for the program report.

Allison Wins Competition For Army 250-HP Engine

Allison Engine Division of General Motors Corp. is the winner of the Army's competition for a 250 horsepower turboshaft engine. Design proposals were evaluated for the Army by Wright Air Development Center and Air Materiel Command.

However, the final decision was the Army's. Contract negotiations with Allison were conducted by Air Materiel Command for the Army. Amount of the contract has not been disclosed, nor has the Army disclosed the plans for use of the powerplant in the future.

New NATO Airfields Plan Provides More Flexibility

New objective for North American Treaty Organization airfields is to provide an improved cross-servicing capability. This means simply that an airfield normally assigned specific types of aircraft will be given both the ability and facilities to provide flyaway services to other types of aircraft.

Basic cross-servicing capability has been built into many of the NATO fields in Central Europe—meaning that the airfield can provide adequate services for combat aircraft to permit the planes to take off and return to home bases or to return to another field. Now the program is to be stepped up.

Under the new program, the air base will be able to receive and completely reservice any NATO combat aircraft to a point where it can take off and complete a combat mission. Result is greater operational flexibility and reduced danger from weather and other hazards which might block use of home bases.

Industry Briefs

Manufacturing

The Martin Co. has tentatively scheduled a public offering of $25 million in debentures for early July. Proceeds would be used to provide extra working capital required by a change in Defense Dept. regulations last year.

North American Aviation will lay off about 3,000 employes in its Los Angeles division by the end of August, due to stretchout of F-100 production and completion of an F-86 modification program. Northrop Aircraft will lay off about 100 a week for the next two or three months at Hawthorne. Lockheed-Marietta is recalling 1,000 because of increased business.

Air Materiel Command will use the Cessna dealer organization to supply parts for the L-27A, USAF version of the Cessna 310B. Under this arrangement, it will be unnecessary for USAF to establish an inventory, thus saving costs of storage, transportation and management of inventories.

Lockheed Aircraft Corp. assigned C. L. (Kelly) Johnson, former v.p.-research and engineering, to devote full time to planning and execution of special product and advanced development projects. Hall L. Hibbard takes over responsibilities of v.p.-research and engineering and retains his post of senior vice president in the policy-making group.

Republic Aviation Corp. delivered its first Alouette II rotojet helicopter to Inlet Airways, Alaska. The helicopter is assembled and marketed in North and Central America by Republic and is powered by a 400-hp Artouste IIb-1 turbojet engine. Inlet will use the aircraft for oil-geology survey work and in connection with Alaskan fisheries and canning firms.

LaVezzi Machine Works is celebrating its 50th anniversary. The Chicago firm has been in the aviation industry since the beginning of World War II and produces parts for aircraft and missile components and instruments.

The Camair Corp., New Kingston, Pa., a newly formed company, has purchased the manufacturing rights of the model 480 Twin Navion from Camair Div. of Cameron Iron Works, Galveston, Tex.

A Texas company is reported to be developing a two-place version of the Midget Mustang for the business-plane market. Original airplane was built by Schweizer Aircraft Corp. for participation in the Goodyear races.

Military

Sikorsky Aircraft has received CAA certification for its automatic stabilization equipment (ASE), designed to stabilize the flight of helicopters. The ASE has been standard equipment on all HSS-1 (S-58) helicopters bought by the Navy during the past four years.

Cost of military planes now being delivered runs about $50 per lb., against $10 during World War II and $25 in the Korean conflict, says Perkins McGuire, Assistant Secretary of Defense for Supply and Logistics. Within the next two or three years, cost will probably rise to $70 or $80 a lb., he added.

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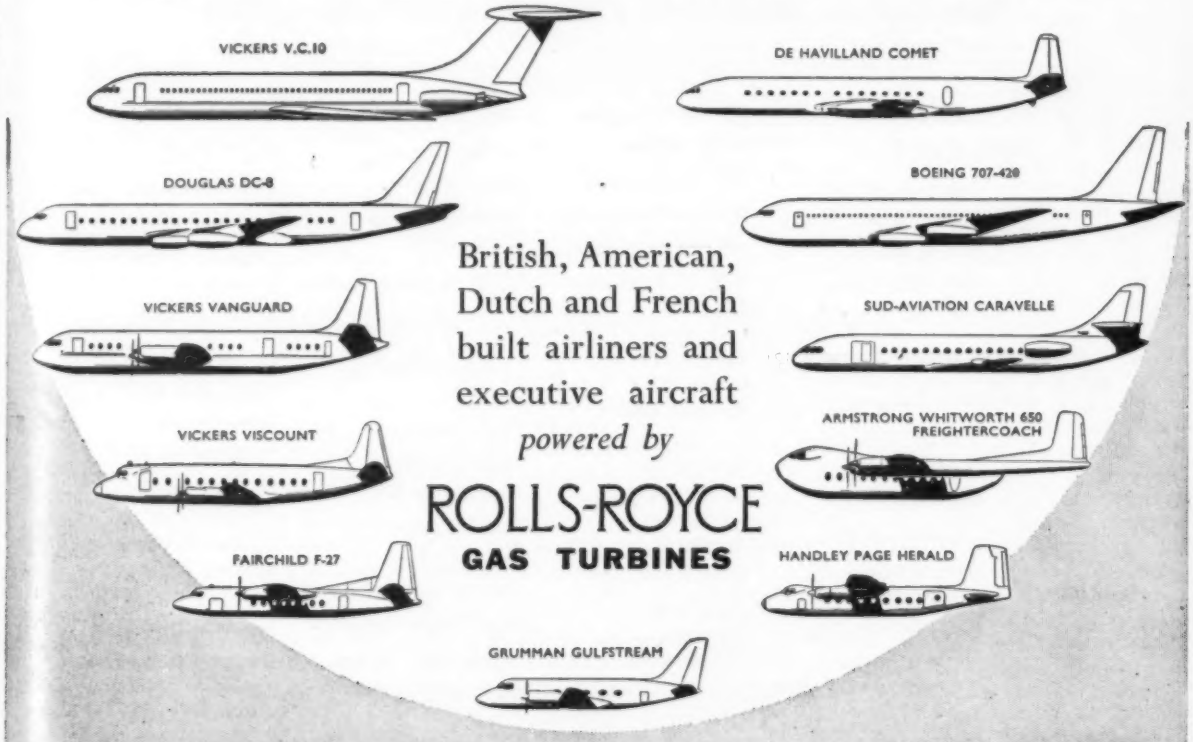

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- Servo Amplifiers (2)
- Sub-Carrier Oscillators (2)
- Mach Control
- Multi-Coder
- DC-20 Multi-Coder
- DB-1 Multi-Coder
- Destructor Control
- Function Relay Calibrators (2)
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- **How much does a military airplane cost?**
- **What happens if prices keep rising?**
- **Is a 'prototype' air arm the answer to . . .**

The Pentagon's Dismal Dollar Dilemma

by Elizabeth Oswald
Defense Editor

Quantity or quality? On a budget limited to what the fiscal authorities believe the country can afford, it's impossible to have both. This is the bitter truth with which both the Air Force and the Navy's Bureau of Aeronautics are again confronted as they make ready the final version of the programs outlined about 18 months ago.

The plain facts are that as Mach numbers, range and operating altitudes increase, the cost of aircraft increases proportionately. The result is that the services are once again finding that they can't make costs and the quantity of aircraft they'd "like to have" come out even.

As a case in point, the now retiring B-36 is estimated to have cost a little more than $4 million a copy, once the learning curve was past and development costs were absorbed. Costs on its successor, the B-52, range all the way from $29,383,666 for the development model down to a little more than $6.6 million for the B-52F. But remember that the B-52 is being produced in what has been termed production numbers. Some 601 were ordered and a few more will be ordered by the Air Force next year.

• **No big orders upcoming**—There won't be production quantities ordered in the future. Lt. Gen. C. S. (Bill) Irvine, deputy chief of the Air Staff (Materiel), has made this clear in a number of speeches. Why?

The reasons given are dependent to a large extent on who's talking. In some cases, the answer is simply: "The new and more sophisticated weapons can do a job as a single unit that would have taken whole squads of older aircraft."

Others say: "We can't afford the aircraft. We'd break the economy." Still others say that the forces in being must be sacrificed for the sake of bringing in at the earliest possible moment new and unconventional weapons.

There isn't any question, of course, that costs are climbing. Unit cost of the B-47E medium bomber—again a production model—is estimated at about $1.9 million, of which the airframe represented almost $1.3 million —with the rest of the costs spread among the engines, electronics, ordnance and armament.

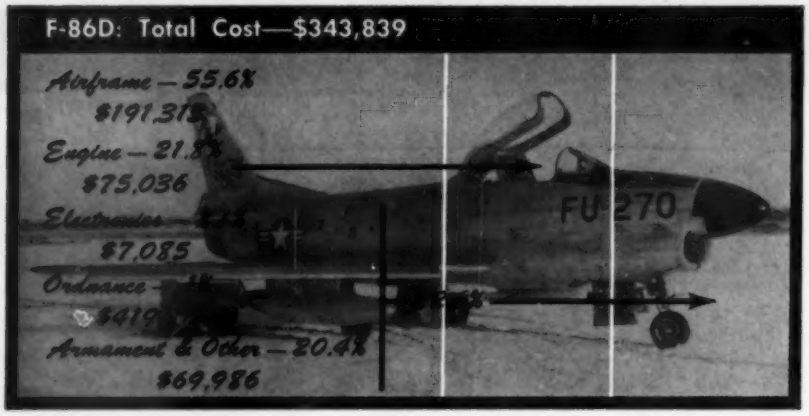
Cost of the B-58, first supersonic bomber, originally labeled a substitute for the B-47, is any man's guess at this time. Nobody knows for sure how many will be ordered. As of now only 31 have been ordered, with plans calling for an additional 40-odd in fiscal 1959. Estimated fiscal 1959 program amounts to $758 million. Cost of the first model, which includes, of course, research and development, is estimated at approximately $53 million, of which engines represented about $2.8 million.

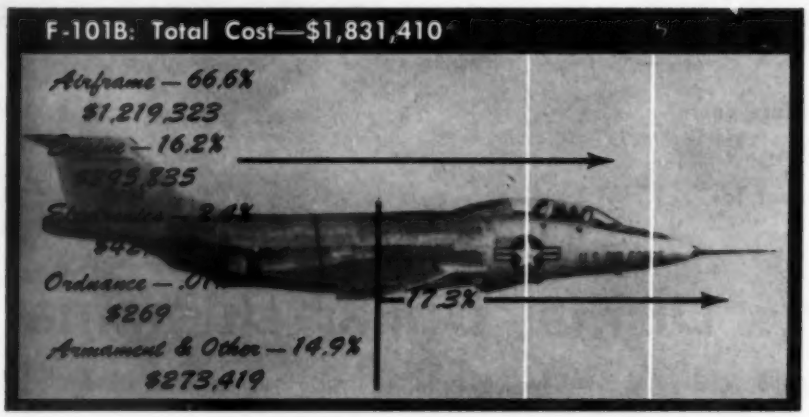
The complex new bomber costs can be explained, however, in terms of "sophistication" and versatility. There are some 14 major subsystems. In addition, three pods which can be carried interchangeably by the bomber will permit maximum use of the plane for many purposes which formerly required a number of different types of aircraft.

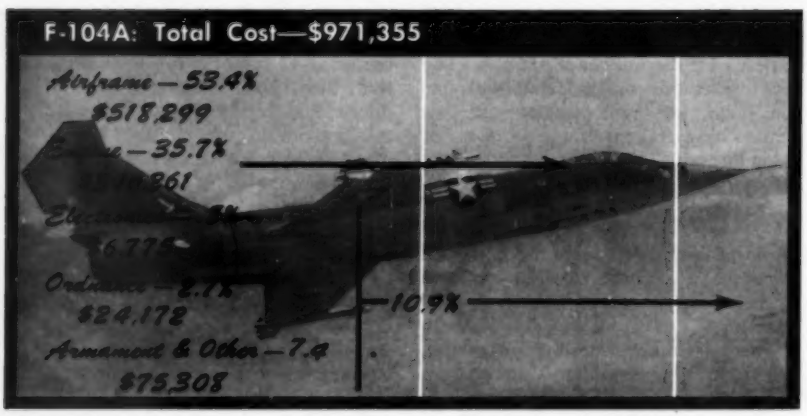
The same story can be repeated as far as fighter-type aircraft are concerned. The F-84F fighter-bomber came to about $770,000 a copy, with the engines representing about $146,000, the airframe about $563,000 and the balance made up of electronics, ordnance and armament. Similarly, the F-86F came to a cost of about $211,111, including its engine, airframe, electronics and ordnance. The long range all-weather F-89H, still in the inventory of the Air Defense Command, was the first of the fighters to cost more than $1 million a copy, of which the airframe represented just about half and engines, electronics and armament represented the difference.

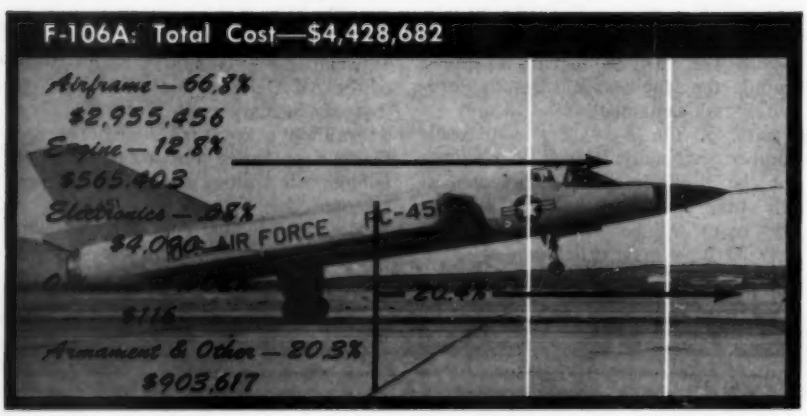
How sharp the cost increases are shows up more plainly in the so-called "Century series." First models of the F-100 came to about $1 million a copy, with the costs dropping down in the case of the F-100C to a low of about $662,000 a copy.

Only other plane in the Century









series to fall below the million-dollar mark was the F-104A.

• **Why costs are so high**—What's the reason for the huge increases? A World War II bomber took 200,000 engineering man-hours. The first supersonic bomber (the B-58) took 9,340,000 engineering man-hours and the chemically fueled (B-70) bomber is expected to take 14.5 million man-hours.

The supersonic speeds at which the modern fighter travels require wing coverings 10 times thicker than the aluminum sheets used in World War II fighters. And the cost of manufacturing and fabricating these skins is another story both in technology and cost.

Similarly, the current jet fighter, with its one-man crew (usually) with black boxes in place of another man in the cockpit, has about 10 times as much electrical wiring as the early jet models.

And looking ahead to the future with planes to be equipped with such items as a control system which "thinks" for the pilot, the costs of development will climb still further. With it, since relatively few units are to be ordered, unit costs won't come down.

While Air Force costs have been used as examples, the Navy's problems are said to be even worse than those of the Air Force. This is because even smaller numbers of aircraft are used, and more models are seemingly required to do the numerous jobs which the Navy assigns to its planes.

How bad the story really is was indicated recently when the Air Force announced that it would start a $40-million program to modernize the B-47, its 10-year-old medium bomber, and would use the B-58 as a "supplement" rather than as a "substitute" for the B-47, which is today still described as a major part of the backbone of the Strategic Air Command. The worst part of it is, according to informed sources, that no one is quite sure of whether the modernization program will work well enough to maintain the capability of "forces-in-being."

• **Navy can't fill needs**—As far as the Navy is concerned, the economy drive has now progressed to a point, according to Vice Admiral W. V. Davis, Jr., who has just completed a tour as vice-chief of naval operations (air), that the Navy is now unable to buy sufficient aircraft to take care of normal attrition (i.e. aircraft destroyed in accidents or retired for old age).

In fiscal 1958, the Bureau of Aeronautics originally planned to buy some

dollar dilemma

36 models of aircraft. In January of 1958, following the start of the economy drive, models in the Navy's shopping list were reduced to 18 by a stroke of the pen—i.e. the cancellation of all buys of 18 models. Of the remaining 18 models ordered, total numbers were sharply cut. In one case, the buy was reduced by 29%. In another, the reduction amounted to 38%. In one case, the cutback amounted to 82%.

Where does the story point? Former Defense Secretary Charles E. Wilson said on his retirement from the Pentagon that perhaps the greatest unanswered question that he was leaving was: "What kind of a balance can be struck between the money to maintain forces in being as compared with what should be spent for the new and untried (as yet) weapons of the future?"

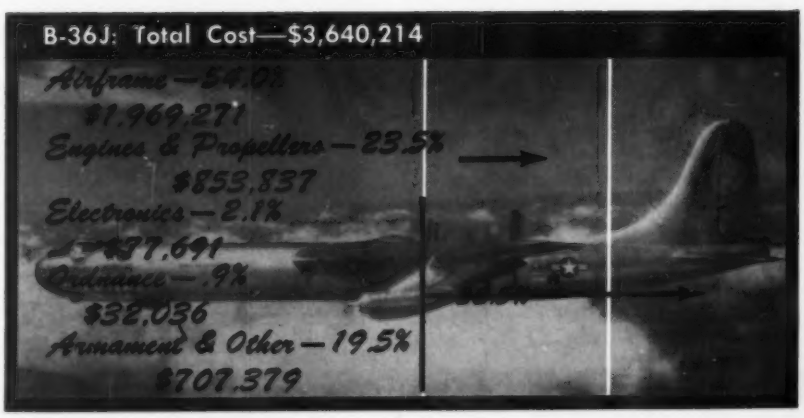
This is the problem which no one has yet answered. As a result programs now being established satisfy no one since they represent a compromise between the advocates of the forces-in-being and the advocates of an all-out research program. And when a choice has to be made—it's the new and untried weapons of the future which get the nod with the result that further cutbacks, bringing increased costs are made in conventional-type weapons.

• **Questions to be answered**—What are the answers? Before they are found perhaps some basic questions must be answered. What are they? First, and most important, should defense be tailored to the economy? This of course requires an estimate in high places of the extent of present and immediate future danger, a job which, according to reliable reports, hasn't been done yet.

Second, should performance be sacrificed in the interest of economy? This question arises because basic costs of new weapons as compared with the older ones are increasing in direct proportion with higher performance.

Third, are our dollars buying more defense despite increases in spending estimated by Rep. George Mahon (D-Tex.) chairman of the Defense Appropriations Subcommittee? Mahon says that, despite the planned increase in spending of about $1.2 billion in fiscal 1959 over fiscal 1958, the Pentagon may, because of rising costs and inflation, be buying somewhat less defense.

Fourth, will the determination to keep the lid on defense end up ultimately with severely limited numbers of prototype aircraft and limited numbers of operational aircraft of the combat type to a point where in the foreseeable future the defense of the United States may be endangered?



Shape of Things to Come

Artist's concept of the X-15 research aircraft developed as a cooperative enterprise by the National Advisory Committee for Aeronautics, the Air Force and the Navy's Bureau of Aeronautics. Target is a plane which will fly at 3,600 miles per hour and climb more than 100 miles into the atmosphere.

North American Aviation Inc. is now cutting the metal for the aircraft, which is scheduled to fly next year. Reaction Motors is making the rocket motors that will give the aircraft its power. A B-52 Boeing bomber is being modified to carry the X-15 to altitude.

Tusco's Version of Navion

Tusco Navion "D" unveiled at the annual convention of the Aviation Writers Association is an extensively modified Ryan model. Tusco purchased the manufacturing rights from Ryan Aeronautical Corp. Performance is upped by the installation of a 240-hp Continental C-470-P engine driving a McCauley constant-speed prop. Addition of tip-tanks, each containing 34 gals. of fuel which, with standard tanks, has increased the cruise range to 1,500 miles. Maximum speed at sea level is 185 mph; cruise speed is 169 mph. Gross weight is increased to 3,150 lbs.

DC-8's Maiden Flight

Douglas DC-8 jet airliner shown taking off on its maiden flight from Long Beach Municipal Airport. The flight lasted two hours, in which time checks were made on controls, systems, landing gear, flaps, pressurization and air conditioning. The jet transport used 3,500 ft. of runway on its first takeoff. To date, a total of 143 DC-8s have been ordered by nine U.S. airlines and nine foreign carriers. It is expected to enter regular airline service in late 1959.

B-36 Leaves the Picture

The last B-36 intercontinental bomber flies out of the picture at Carswell Air Force Base, Fort Worth, Tex. on Memorial Day as the Convair B-58, supersonic Hustler flies in. In the middle is the Boeing B-52 superfortress, which ultimately will be organized into 12 Strategic Air Command heavy bomber wings. Differences in cost, size, speed and complexity and the problems they present to Pentagon budget-makers are spelled out in "The Pentagon's Dismal Dollar Delimma" (P. 17). First B-58 unit will be organized at Carswell, probably late this year.

Latest Style in Helicopter Tails

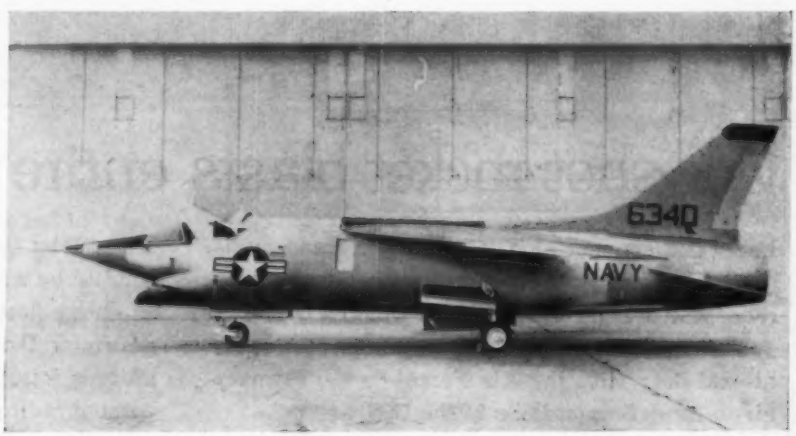
Kaman K-600 utility helicopter aimed at commercial and foreign market is generally similar to the military HOKs, HUKs and H-43As. New model features revised tail configuration for which better flight characteristics are claimed. Powered by Pratt & Whitney R-1340 engine, helicopter is fitted with tracking device which permits pilot to adjust track of rotor blades under all flight conditions.

Two-Way Transistor Radio

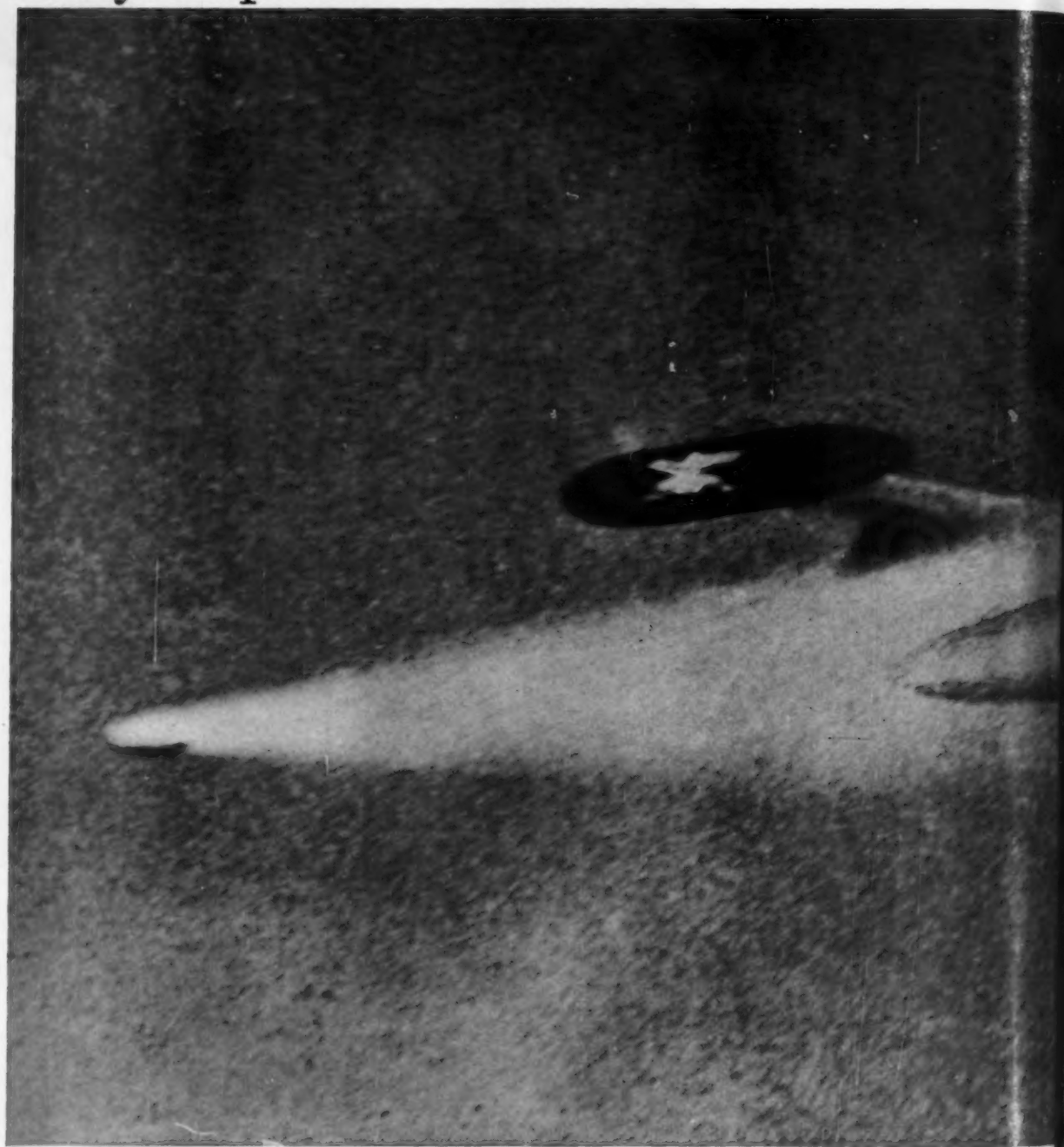
Two-way transistorized radio used by United Air Lines was developed by United's engineers and Radio Specialists Co., Denver. Weighing five and a half pounds, unit has four-mile range.

A New Crusader Bows

Navy's new all-weather Chance Vought F8U-3 fighter, differs from previous Crusaders in longer nose, forward-swept airscoop and two ventral fins located toward the tail. Fins extend horizontally at low speed, but turn downward almost 90 degrees at high Mach numbers for additional stability. Powerplant is a Pratt & Whitney J75 with afterburner, providing about 26,000 lbs. thrust. Armament consists of Sparrow III and/or Sidewinder missiles.



Today's air power in action:*

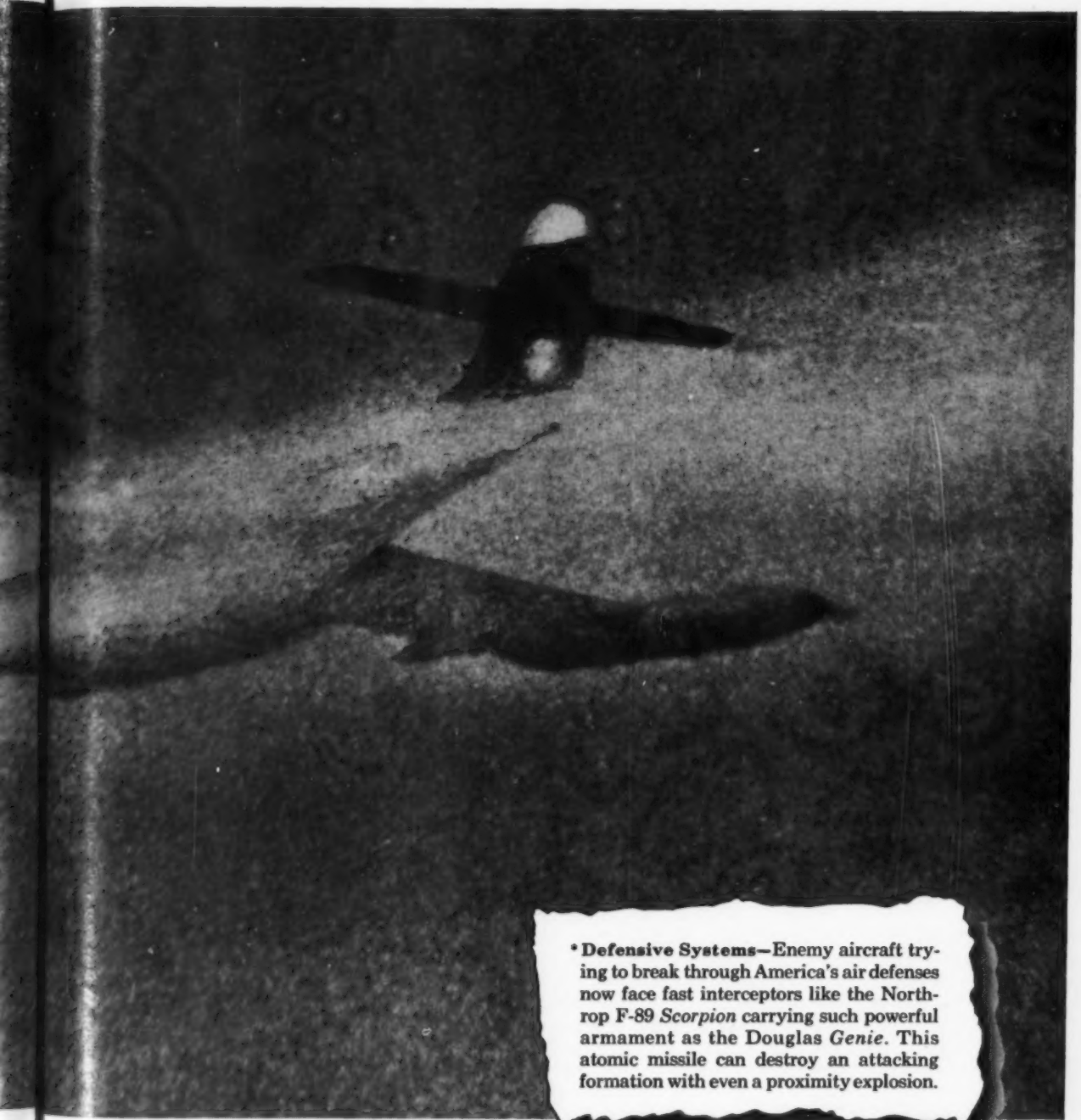


One-shot rocket blasts entire attacking fleet

Early last summer at Yucca Flats, Nevada, military observers saw the first demonstration of a new concept in defense weapons—the Douglas *Genie*...

Today this formidable nuclear missile is on operational duty with the Air Force—is the primary air-to-air defense missile in the U.S. arsenal.

The stubby *Genie* rocket is compact enough to be handled by a fast interceptor — yet can knock out an entire fleet of bombers with a single hit or a near miss. Designed primarily for use against high altitude jets, *Genie's* atomic warhead can be fired without radioactive fallout. It is thus usable against



*** Defensive Systems**—Enemy aircraft trying to break through America's air defenses now face fast interceptors like the Northrop F-89 *Scorpion* carrying such powerful armament as the Douglas *Genie*. This atomic missile can destroy an attacking formation with even a proximity explosion.

sneak attacks over our own or friendly territory.

Rapid development of *Genie* from design and test stages into quantity production is typical of the speed and thoroughness of the Douglas approach. To date Douglas has produced almost twenty thousand experimental and operational missiles for the Army, Navy and Air Force in *all four major categories:* air-to-air, air-to-surface, surface-to-air and surface-to-surface.

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The profit squeeze is still on, so . . .

More Airlines May Omit Dividends

by Selig Altschul

Financial Editor

With two major airlines, previously on a sustained-payment basis, omitting cash dividends this year, attention will be focused on the possibility that other carriers with established dividend disbursement records will follow suit before 1958 is over.

There is a real probability that unless earnings improve materially, the list of airline dividend casualties will increase during 1958. In fact, thus far this year, no less than five airlines paying their regular dividend rates were forced to dip into surplus to do so as earnings were insufficient for this purpose. (See Table No. I.)

Thus a sorry dividend record becomes even more gloomy when it is realized that out of the twelve trunks and Pan American, only nine paid any cash dividends whatsoever during 1957. (See Table II.) This is a natural consequence or aftermath of the profit squeeze reversing earnings, where existent, into deficits.

The airline industry has never been known for any liberal dividend disbursements to its stockholders. At best, cash dividends, where paid in past periods, have been moderate in themselves and in relationship to available earnings.

• **Payout record is poor**—Certainly, the airline dividend payout record falls far short of approaching U.S. corporate experience for all industry. (See Table III). The percentage payout for the airlines was boosted disproportionately in 1957, because in the face of the sharp decline in earnings, a valiant effort was made to maintain previously established dividend rates. In some cases (Braniff and Delta) dividends paid were not even earned.

National Airlines, early this year, omitted its cash dividend. Instead, it paid 5% in a stock dividend; 2½% taking the place of the previous 25 cents cash disbursement and the remaining 2½% representing an extra stock disbursement. Another stock dividend of 2½% was paid on May 16. In effect, stock dividends represent a transfer of past earnings to the capital stock account rather than a distribution of current earnings.

Previously, National had inaugurated a cash dividend record, starting in 1951, when a total of 25 cents per share was paid. In 1956, the company established an annual rate of $1.00 per share, which was maintained through 1957.

Delta, which paid quarterly dividends consecutively since April 1951, establishing one of the best records in the industry in this respect, passed the 30 cents quarterly cash disbursement normally due in June this year.

Since September, 1956, Delta had been paying 30 cents quarterly with the last dividend disbursement having been made in March 1958. This recent action was inevitable, with earnings for the carrier amounting to 30 cents a share for the nine months ended March 31, 1958, as compared with $1.37 per share for the like 1957 period.

• **American keeps up rate**—American, which paid a total of more than $8.4 million to its preferred and common stockholders last year out of net earnings of $10.9 million, is maintaining its established dividend rate on its common stock despite the fact that earnings for the first quarter fell short of the dividend requirement. On a $1.00-per-common-share basis since 1956, American has declared two 25-cent share disbursements on the common stock for 1958. Yet earnings for the first quarter, boosted by capital gains, came to but 19 cents per share.

Pan American World Airways has the longest cash dividend record among all the air carriers. The company inaugurated cash dividends back in 1933 but suspended in 1939 and 1940. However, in 1941, cash dividends were resumed and have been maintained ever since. While not designated officially as such, quarterly dividends of 20 cents per share have been paid since 1954. Two such payments have been declared

—Table No. I—Airline Earnings and Cash Dividends—

First Quarter—1958 Per Common Share

	Earnings		Dividends Paid	
	Amount (000)	Per Share	Amount (000)	Per Share
American	$1,635	$0.19	$2,104**	$0.25
Braniff	426	0.14	442***	0.15***
Capital	1,469*	1.61	None	None
Continental	307*	0.41*	None	None
Delta	43	0.04	337	0.30
Eastern	2,167	0.74	732	0.25
National	586	0.53	None	None
Northeast	1,481*	0.83*	None	None
Northwest	795*	0.60*	276**	0.20
Pan American	3,360*	0.55*	1,227	0.20
TWA	11,063*	1.66*	None	None
United	385*	0.11*	433	0.125
Western	136	0.15	177	0.20

Note: *Deficit **Includes dividends paid on preferred stock ***Quarterly allocation, company has previously indicated semi-annual dividend paying basis.

—Table No. II—Cash Dividends Per Common Share*—

	1953	1954	1955	1956	1957
American	$0.50	$0.60	$0.80	$1.00	$1.00
Braniff	Nil	0.50	0.60	0.60	0.60
Capital	Nil	....[1]	....[1]	Nil	Nil
Continental	0.50	0.50	0.50	0.50	....[3]
Delta	0.80	0.96	0.96	0.96	1.20
Eastern	0.48	0.48	0.96	0.98[2]	1.00[2]
National	0.50	0.60	0.60	1.00	1.00
Northeast	Nil	Nil	Nil	Nil	Nil
Northwest	Nil	Nil	0.60	0.80	0.80
Pan American	0.65	0.80	0.80	0.80	0.80
TWA	Nil	....[5]	Nil	Nil	Nil
United	1.40	1.40	1.40	1.40	0.48[4]
Western	0.56	0.56	0.83	0.75[5]	0.79[5]

Note: [1] Paid 5% in stock, [2] Plus 2% in stock, [3] Paid 10% in stock, [4] Plus 7% in stock, [5] Plus 4% in stock. *Adjusted for all stock dividends.

thus far in 1958. Yet Pan American reported a net loss of 55 cents per share for the first quarter of this year.

The reasons for maintaining regular dividend payments even during short intervals when earnings are deficient for such purposes are well founded. More than likely, managements have every reason to hope that earnings will improve later in the year and hence for the full twelve months, adequate coverage for all dividend payments will be shown.

Frequently, it is sound corporate practice to pursue a definite policy of making consistent, regular cash dividend payments to stockholders even in the face of heavy capital outlays. In this manner, investor confidence is developed. An atmosphere of stability can be brought into being where regular income may be anticipated from available earnings. Ultimately this can serve to attract capital on more favorable terms from the investing public.

The airlines, as a group, have been most deficient in this respect as compared with other industries. For this reason, the airlines are frequently at a disadvantage in the competitive money pits when seeking capital for expansion purposes.

Table No. III—Comparative Cash Dividend Disbursements

	Domestic Trunk Airlines			U.S. Industry Average		
	Net Profit After Taxes	Dividend Payments	% Div. Payout	Net Profit After Taxes	Dividend Payments	% Div. Payout
	(In millions)			(In billions)		
1951	$43.5	$12.5	28.7%	$18.7	$9.1	48.7%
1952	53.5	12.7	23.7	16.1	9.0	55.9
1953	48.4	13.0	26.9	16.7	9.3	54.7
1954	51.5	15.0	29.1	16.0	9.9	61.9
1955	63.1	18.8	29.8	21.0	11.0	52.4
1956	57.7	20.1	35.0	21.0	11.9	56.7
1957	26.6p	18.9	71.0p	20.6p	12.3p	59.7p
Average 1951-1957	49.2	15.9	32.3	18.8	10.4	55.9

Note: p—preliminary

Source: Domestic Trunk Airlines—CAB and company reports; U.S. Corporate Experience—Department of Commerce

Ironically, reported results thus far this year for many carriers are being inflated by comparison with those of last year as a result of the enforced change in various accounts, as directed by the CAB. Even so, earnings as currently being stated may fail to cover a number of established dividend rates.

Domestic Airlines Report Salaries of Officers and Directors

Annual reports of 1957 salaries, other compensation and shareholding of officers and directors of the following airlines have been filed with the Civil Aeronautics Board. Formerly designated Schedule E reports by the CAB, these are now designated Schedule G-42 reports.

Figures given are salaries unless otherwise stated.

HAWAIIAN AIRLINES, LIMITED

OFFICERS AND DIRECTORS: **Arthur D. Lewis**, pres. & dir., $40,240 salary, $6,094 expenses; **Brian Cooke**, vp-treas., $22,000 salary, $3,150 expenses; **Lionel D. Machado**, vp-opns., $20,500 salary, $4,994 expenses; **Jack C. Tobin**, vp-sales, $20,500 salary, $5,434 expenses; **Lambert P. Irons**, secy., $10,350 salary, $435 expenses; **George K. Tanabe**, asst. treas. & asst. sec., $10,600 salary, $681 expenses; **Stanley C. Kennedy**, chm. of bd., $220 dir. fee; **M. B. Crason**, $220 dir. fee; **James M. Greenwell**, $470 dir. fee; **Chinn Ho**, $160 dir. fee; **Dudley C. Lewis**, $220 dir. fee; **John F. Russell**, $140 dir. fee; **Theodore Smyth**, $40 dir. fee; **Sakae Takahashi**, $140 dir. fee; **Wilfred Tsukiyama**, $240 dir. fee; **George Vicars**, $220 dir. fee; **David Watson**, $240 dir. fee; **H. W. B. Whate**, $430 dir. fee; **G. P. Wilcox**, $160 dir. fee.
PERSONS OTHER THAN officers, directors and employes who were paid more than $10,000 for personal services during 1957 were: **William M. Crilly**, Pacific charter investigation, $11,180.

LAKE CENTRAL AIRLINES

OFFICERS AND DIRECTORS: **Gwin Hicks**, pres. & dir., $15,000 salary, $6,617 expenses; **L. W. Hartman**, vp & dir., $12,000 salary, $376 expenses; **R. W. Clifford**, vp & dir., $12,000 salary, $779 expenses.

NEW YORK AIRWAYS, INC.

OFFICERS AND DIRECTORS: **Robert L. Cummings, Jr.**, pres. & dir., $18,126 salary, $11,213 expenses; **Horace Brock**, vp & dir., $15,134 salary, $1,734 expenses; **Jack E. Gallagher**, vp (12-2-57*), $13,711 salary, $4,995 expenses; **William W. Hogan**, treas., $10,970 salary, $2,892 expenses; **Glen B. Eastburn**, asst. to pres. & asst. treas., $9,723 salary, $2,090 expenses; **Gerald J. Glynn**, asst. treas., $7,309 salary, $546 expenses; **Agnes Fallon**, asst. secy., $4,429 salary, $50 expenses; **Hoyt Ammidon**, $25 dir. fee; **Robert E. Blum**, $125 dir. fee; **Robert W. Dowling**, $50 dir. fee; **Fred M. Glass**, $150 dir. fee; **Robert G. Goelet**, $125 dir. fee; **Knox Ide**, $100 dir. fee; **Grover Loening**, $150 dir. fee, $500 bonus & indir.; **Samuel C. Park**, $100. dir. fee; **William Shields, Jr.**, $150 dir. fee.
NOTE: *Date of assuming position.
PERSONS OTHER THAN officers, directors and employes who were paid more than $10,000 for personal services during 1957 were: **George Daly Associates**, New York City, public relations, $13,134; **J. M. Mathes, Inc.**, N.Y.C., advertising, $11,299; **Loomis, Suffern and Fernald**, N.Y.C., audit services, $11,969; **Skadden, Arps, Slate & Timbers**, N.Y.C., legal services, $32,000.

NORTH CENTRAL AIRLINES, INC.

OFFICERS AND DIRECTORS: **H. N. Carr**, pres. & dir., $34,556 salary, $900 dir. fee; **F. N. Buttomer**, vp-traffic & sales, $12,820 salary; **A. E. Schwandt**, vp-inds. rel., $10,300 salary; **R. H. Bondio, Sr.**, vp-maint. & engr., $11,820 salary; **A. D. Niemeyer**, vp-opns., $12,360 salary; **Bernard Sweet**, secy.-treas., $10,200 salary; **A. E. A. Mueller**, chm. of bd., $21,042 salary, $900 dir. fee; **W. L. Christensen**, dir., $700 dir. fee; **G. F. DeCoursin**, dir., $2,400 salary, $700 dir. fee; **K. B. Willett**, dir., $700 dir. fee; **A. L. Wheeler**, dir., $19,125 salary, $700 dir. fee; **R. P. Grover**, $700 dir. fee.
PERSONS OTHER THAN officers, directors and employes who were paid more than $10,000 for personal services during 1957 were: **Klau-Van-Pieterson-Dunlap**, Milwaukee, advertising, $79,807; **Ray and Ray**, Washington, statistical information, $18,394.

NORTHEAST AIRLINES, INC.

OFFICERS: **James W. Austin** (12-11-57*), exec. vp, $2,032 salary; **Nelson B. Fry** (12-11-57*), vp-traffic & sales, $1,129 salary; **George E. Gardner**, pres. & dir., $25,706 salary, $5,000 bonus & indir.; **Hamilton Heard** (7-1-57*), treas., vp-adm. & fin., $15,000 salary, $1,500 bonus & indir.; **Robert H. Kerr** (2-1-57*), vp-personnel, $11,800 salary, $1,000 bonus & indir.; **Alfred A. Lane**, vp-oper., $17,500 salary, $1,500 bonus & indir.; **Rembrandt P. Lane, Jr.**, comptroller (5-1-57*), treas. (7-1-57*), $10,000 salary; **D. W. H. MacKinnon**, vp-engr. & maint., $14,750 salary, $1,500 bonus & indir.; **Wheaton W. Mies** (10-1-57*), asst. vp-engr. & maint., $10,308 salary, $250 bonus & indir.; **James F. Molloy** (7-1-57*), asst. vp-adm. & finance, $8,250 salary; **Gerard E. Reed**, asst. treas., $9,300 salary, $125 bonus & indir.
NOTE: *Date of assuming position.
PERSONS OTHER THAN officers, directors and employes who were paid more than $10,000 for personal services during 1957 were: **Foley Hoag & Eliot**, Boston, legal services, $84,500; **Lybrand, Ross Bros. & Montgomery**, Boston, accounting systems review, auditing income tax, $35,760; **J. Walter Thompson Co.**, New York City, advertising, $57,629; **Chambers & Wiswell**, Boston, advertising, $945,096; **R. Dixon Speas Associates**, Flushing, N.Y., aircraft consultants, $13,609; **Charles Butler Associates**, N.Y.C., design consultants, $11,293, and **Dickie-Raymond, Inc.**, Boston, advertising, $12,057.

OZARK AIR LINES, INC.

OFFICERS AND DIRECTORS: **L. D. Hamilton**, pres., $36,000 salary, $900 bonus & indir.; **A. A. Blumeyer**, vp, $900 bonus & indir.; **A. G. Heyne**, secy., $4,667 salary, $900 bonus & indir.; **F. W. Jones**, treas., $7,200 salary, $900 bonus & indir.; **B. T. Mattingly**, chm. of bd. (deceased 7-18-57), $6,750 salary, $4,450 legal fees; **O. L. Parks**, dir., $900 bonus & indir.; **E. W. Weaver**, $375 bonus & indir.; **G. O. Shaver**, dir. & capt., $11,392 salary, $900 bonus & indir.; **C. A. Bachman**, dir., $900 bonus & indir.

PACIFIC NORTHERN AIRLINES, INC.

OFFICERS AND DIRECTORS: **A. G. Woodley**, pres. & dir., $35,000 salary, $300 dir. fee, $4,354 expenses; **John A. Cunningham**, vp & dir., $16,500 salary, $300 dir. fee, $501 expenses; **Harold A. Olson**, vp, $14,135, $769 expenses; **J. F. Foster**, vp, $14,135 salary, $408 expenses; **Felix Aubuchon**, vp (5-15-57*), $12,000 salary, $167 expenses; **C. W. Nelson**, secy.-treas. & dir., $12,850 salary, $300 dir. fee, $96 expenses; **D. B. Hart**, asst. secy., $453 expenses; **Robert Kinsey**, cont. $13,200 salary, $2,518 expenses; **T. D. Stuart**, dir. of ind. rel., $11,550 salary, $377 expenses; **R. A. Rowan**, dir., $200 dir. fee, $308 expenses; **Gerald P. O'Grady**, dir., $24,000 salary, $200 dir. fee, $783 expenses; **Paul Porzelt**, dir., $100 dir. fee, $442 expenses; **Max B. Kirkpatrick**, $200 dir. fee.
NOTE: *Date of assuming office.

TRANS-TEXAS AIRWAYS

OFFICERS AND DIRECTORS: **R. E. McKaughan**, pres. & dir., $26,600 salary, $4,385 expenses; **H. E. Erdmann**, vp-opns. & dir., $14,000 salary, $956 expenses; **L. J. Erchner**, vp-traffic & sales, $14,000 salary, $1,839 expenses; **M. L. Muse**, secy.-treas., $11,800 salary, $655 expenses; **W. C. Leatherwood**, dir. of purchasing & dir., $8,800 salary, $193 expenses; **J. K. Ayer**, exec. asst. to pres. & dir., $8,800 salary, $2,929 expenses; **L. A. Downes**, chief pilot, $12,300 salary, $338 expenses.
PERSONS OTHER THAN officers, directors and employes who were paid more than $10,000 for personal services during 1957 were: **Clark, Coon, Holt & Reid**, Dallas, legal services, $17,648; **Tracy, Locke & Company**, Houston, advertising, $127,713.

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Congress Chops Spare-Parts Program

by Charles Schaeffer

Legislative Editor

Long-critical Congressional purse-string holders have made good earlier threats to scale down the Defense Department's aircraft spare-parts procurement program.

A $343-million across-the-board spare-parts reduction ordered by the House Appropriations Committee stands out in sharp relief against almost eagerly approved increases in some other accounts. The move was the culmination of repeated warnings to the military to reduce its own expensive aircraft spares requirements.

Small in comparison to a $38.3 billion fiscal 1959 budget request to run the defense program for the next year, the reduction, nevertheless, slams hard at industry. What it means is a strict fiscal ceiling on the volume of spares three military services will be allowed to buy with each aircraft.

Military officials, meanwhile, went before Senators to outline the effect of the cut-back, and Defense Chief Neil McElroy has asked for a restoration of the cash.

• **House intent is clear**—The House felt that procurement officers, making new aircraft awards, should be barred from applying any more than 20% of the plane's fly-away cost to spare parts. This had been running higher; as high, in fact, as 38%.

When the committee turned to other accounts, it was more charitable.

Funds for the Air Force overall "buy" program approved by the House unit provide for procurement of 982 aircraft. But part of this total, 39 B-52s and 26 KC-135s, were covered by a supplemental amendment to the 1959 budget sent to Capitol Hill earlier this year. In tabulating final increases or reductions by the committee, this bonus of $1.4 billion must be considered.

• **Aircraft and missiles merged**—The Air Force procurement account merges aircraft and missiles. Of $6,308,200,000 approved, $758 million is earmarked for the B-58 Convair jet bomber, considered by Military Appropriations Subcommittee chairman, George Mahon (D-Tex.), as the B-47 follow-on.

Another $96 million is programmed against the B-70 chemical bomber—"successor to the B-52."

Missile funds were hiked over the administration request, highlighted by a $48 million boost for the Hound-Dog air-to-ground missile, destined for installation aboard the B-52.

In another action, the committee approved $40 million for development of a nuclear-powered airplane.

For Navy aircraft procurement, the House unit okayed $1,947,095,000—$145.5 million less than the Navy sought and mostly in spare-part slashes. Funds cover the purchase of 679 new aircraft, including an advanced carrier-based plane, carrier-based attack planes and troop and cargo helicopters.

One move—striking $35 million for a second nuclear aircraft carrier—gives advocates of conventional navy airpower little to cheer about.

The committee approved funds for procurement of a Navy all-weather fighter, cautioning air officials to make a choice soon between the F-4H1 and the F8U3.

• **Maintenance and overhaul slashed**—Legislators whacked $6 million from a requested $245,883,000 for maintenance and overhaul. "Increased emphasis upon awards to private industry on a competitive basis for the maintenance and overhaul of aircraft and more prudent operation of the Naval overhaul and repair program can achieve this reduction without difficulty," the report observed

Also funded in the new Navy program are an improved version of existing anti-submarine patrol aircraft, continued improvement of a turbo-powered anti-submarine helicopter and the S2F anti-submarine aircraft.

"Procurement of the jet-powered P6M (Seamaster) will be resumed and procurement of modern aircraft which have proven so successful in meeting the peculiar requirements of naval aviation will be continued," said legislators.

The Army, which had been living off reimbursements and balances, finally scraped the bottom of the cash barrel, necessitating its first big procurement appropriation since the Korean War. The "modernization" funds include procurement money for 420 Army aircraft.

• **Significance of changes**—In the fund-shifting, transfers and general hocus-pocus connected with the new defense budget, the total significance of reductions or increases may be a while emerging into the clear light of day. For airplane-makers the cuts translate into pretty simple English—there'll be $343 million less expended for spare parts and none of a $23 million request for executive aircraft will reach the industry, unless the Senate relents.

To observers of the Congressional scene, the spare-parts squeeze comes as no surprise. A special procurement watchdog group from the House Appropriations Committee has fishily eyed the program for some time.

One of its major complaints is against the consistently "unrealistic" standards applied to aircraft spare parts procurement. Initial spares for the Air Force, for example, are weighed against a wear-out rate applied to the anticipated number of flying-hours for each aircraft.

• **Unused spares costly**—What happens in many cases, say investigators, is that the planes aren't flown anywhere near the projected hours. Consequently, unused spares pile up in mountains of costly waste.

In three recent years, the Air Materiel Command, itself, concluded that procurement officers bought what turned out to be $60 million worth of surplus spares for the F-100. Nearly everyone involved agrees that the problem is a tough one.

The Department of Defense is constantly reviewing the program. It openly concedes that millions of dollars worth of spares are being disposed of each year as surplus or without ever being used. This reached $664 million in fiscal 1956 and $722 million in fiscal 1958, fantastic figures when taken at face value.

But, insists the Defense Department, these factors must be considered:

• The military is assigned the job, first and foremost, of carrying out a war plan and prepares for the worst—which hasn't come, leaving the military holding the excess-parts bag.

• Engineering troubles associated with new aircraft often thwart attempts to fly the planes as long as anticipated.

In six years, the Air Force contends, it has shaved its spare-parts requirements from 43% to 22%, although lawmakers place the figure at 28%. The Navy, according to House figures, is seeking funds this year on a 38% ratio. Whatever the percentage, House fiscal leaders think it's too much. They've allowed funds for 20% and have promised to keep a sharp eye on this troublesome area.

Number Three of a Series

ARTHUR F. "ART" MATTHEWS has been an invaluable member of the F-101 "Team," serving as Assistant Project Engineer over power plant, hydraulics, controls and landing gear. Art and his group displayed a high degree of ingenuity in solving the many hundreds of mechanical design problems encountered in developing the F-101. He was recently appointed Project Development Engineer, and in this capacity monitors all development test programs related to the Voodoo airplanes.

From one basic design has grown the versatile Voodoo family of jet fighters pictured above. First, the long range all-weather fighter-bomber F-101A, the fastest operational airplane in the world. Second, the RF-101 reconnaissance Voodoo, holder of three transcontinental speed records. The third member of the Voodoo family is the F-101B, a supersonic atomic missile-carrying interceptor.

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WEST COAST TALK

by Fred S. Hunter

There's A Danger in Those Airborne TV Dinners; Trans Caribbean Orders DC-8 with 176 Seats

One of the supplemental carriers, we're told, has solved the food problem on the long Honolulu flight by taking advantage of that modern gastronomic invention of the frozen food industry and the supermarket, the TV dinner. This reminds us of Gladwin Hill's amusing observation anent the recent sandwich controversy. "The airlines," said Hill, "have never yet lost a passenger through malnutrition." But what do you suppose would happen if this TV dinner business should become a trend?

But enough of this frivolity. These are important days at Douglas, with the DC-8 flight-test program under way, so let's jot down an item or two on the big jetliner:

It's a big one, for sure. Trans Caribbean Airways, for example, has ordered an interior with 176 seats. That many passengers makes quite a crowd.

It's a heavyweight, too. Full load takeoff weight for the domestic DC-8, whether powered by JT3C-6 (J75) or JT4A-3 (J85) engines, is 265,000 lbs., and for the international version, with either JT4A-3s or British Conways, it is 287,000 lbs. But P&W has an advanced JT4A-9 engine coming along to provide higher tailpipe temperatures and more thrust. When it is available, the international DC-8 can be upped to 310,000 lbs. for takeoff.

The No. 1 flight-test airplane incorporates a couple of items of equipment you won't see on production models: a drag chute in the tail, which can be popped to slow the roll if the brakes fail to hold on a test, and an escape hatch in the underside of the fuselage in recognition of the possibility that a flight test crew might have to bail out. The No. 1 airplane is equipped with a noise suppressor, but no flight reverser. An improved noise suppressor, with a flight reverser, will be installed starting with the No. 3 airplane. Douglas started its flight-test program using JP4 for fuel, but will transfer to kerosene, which the airlines plan to use.

Arthur E. Raymond, vice president-engineering, reports Douglas has spent more than $40 million purely in development costs on the DC-8. Add a substantial investment in real estate, including the new $20-million hangar at Long Beach, very costly expenditures for tooling, the purchase of materials for manufacture, and you find that Douglas has more than $200 million already tied up in the new jetliner. Flight-test costs will now start upping this total materially.

A 1,500-hour flight-test program has been charted by Douglas, Chief Project Engineer Ivar Shogran reports. Nine airplanes will participate; three with J57 power, four with J75s and two with Conways. Meanwhile, three carriers, United, Pan American and Eastern, are scheduled to receive NX airplanes for crew familiarization and training prior to the completion of CAA type certification, and data from these airline-operated planes can be used to augment the flight-test record. Shogran estimates that 10 NX airplanes can be made available for these airlines.

The Douglas type certification schedule calls for CAA approval of the J57-powered airplane to be complete by October, 1959, the J75 by December, 1959, and the Conway by February, 1960. But already there are rumors that United Air Lines, which gets the first DC-8s off the line, has pushed up the projected starting date of its jet operations from December, 1959, to September, 1959, so perhaps Douglas is being conservative in its scheduling. This is something of a Douglas habit.

Cabin air system intakes are located in the nose of the DC-8. They're here for engineering, not decorative purposes, but they give the jetliner a very rakish look when the airplane is viewed head-on. We might add that the paint job on the No. 1 airplane also adds to the rakish appearance, but we have an idea this paint job is due for a change. It tends to create a droop-snoot impression from certain angles, whereas the DC-8 actually has a nose of classic line. And droops are not exactly considered high fashion in Santa Monica.

Low operating costs

On short-sector, high-frequency flights the new Local Service Viscount will provide the lowest operating costs of any postwar aircraft in this category. Design refinements make possible exceptionally low break-even load factors on local service operations. Vickers engineers will gladly make a complete cost analysis of *your* routes.

Proved popularity . . . big capacity

Since its introduction to American service in 1955, the Viscount has firmly established itself as the most *preferred* of all modern airliners. Because of its famed smoothness, silence and speed, the jet-prop Viscount has boosted load factors an average of 35% for 27 airlines worldwide. The new Local Service Viscount will comfortably accommodate from 54 to 65 passengers. In either configuration there is ample space for passenger baggage and mail.

Dependable, economical Rolls-Royce power

The Local Service Viscount is powered by four performance-proved Rolls-Royce Dart 506 jet-props. These engines have demonstrated their outstanding ruggedness and reliability under operating conditions similar to those of local service operations. The Dart 506 engines are unsurpassed for economy, ease of maintenance and hours between overhauls. (TCA reports approval for 1800 hours—with current test engines being run to 2000 hours.) They give the Viscount exceptional take-off and climb performance and a cruising speed of 300 mph at 10,000 feet.

FROM THE WORLD LEADER IN JET-

Fast intermediate servicing and terminal turn-around

The Local Service Viscount can be operated on routes of up to five 100-mile sectors—without refueling and with a minimum of ground handling. Provisions are made for fast under-wing pressure refueling at terminal points (overwing fueling points are also provided).

Less ground equipment is needed and valuable time is saved by the Viscount's integral, hydraulically operated stairs. Further savings are assured as the engines rarely require water-methanol at intermediate stops.

The #4 engine can be kept running during intermediate stop-overs—thus assuring ample power for restarting the engines. If longer stop-overs are required, internal restarting is still possible because of increased battery capacity. Brakes on number 1, 2 and 3 engines prevent windmilling of props, permit safe, quick on-and-off loading of passengers on the left side, freight on the right.

Local Service Viscount means Jet Age growth for you and the communities you service!

By cutting flying time almost in half—and by introducing Jet Age service comparable to the best offered by the "trunk" lines—the Viscount will open doors to important new business traffic that means accelerated growth. This growth will benefit not only local carriers, but the areas they serve—areas that deserve the opportunities that come with the best and most modern airline service.

Because the Local Service Viscount is tailored for highly economical operations—and because its payload capacity is sufficient to absorb future growth—it is the ideal airliner for local service carriers today *and tomorrow!*

For information, contact: Christopher Clarkson, U.S. representative, 10 Rockefeller Plaza, New York 20, N.Y.

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—SAFETY—

WANTED

by George Hart
Technical Editor

Recent mid-air collisions—in one of which a ground radar operator actually saw the aircraft involved come together but had no time to alert them—once again dramatically emphasize the ever-increasing need for an adequate airborne proximity warning system.

This need—surprisingly more pressing in daylight than at night—is demonstrated by the following figures drawn from a CAB survey conducted recently over a period of four months:

- 452 reported near misses exposed 4,429 passengers to death.

Of these:

- 72% occurred in daylight.
- 28% occurred at night.
- 38% occurred in airport control areas.
- 89% occurred within controlled areas in general (Airways, etc.).

These figures confirm without doubt that existing ground control equipment is not designed to cope with the problems of collision prevention. Airborne anti-collision radar and infrared equipment will not exist on a usable basis for a long time. The only immediately available answer, a day-and-night anti-collision lighting system, is fast becoming a must.

• **How Atkins system works**—One such lighting system is that developed by W. H. (Bill) Atkins, Northwest Airlines' pilot. Tests have shown that, under almost all conditions, the blue-white flash of the Atkins light can be seen at least twice as far away as other lights currently in use. The Atkins system employs condenser discharge lamps flashing at frequencies which vary over three segments on either side of the aircraft. It is designed to provide relative heading information as well as proximity warning.

The Atkins light has been demonstrated to members of the Airways Modernization Board and representatives of CAB, CAA, Air Force, Navy and Air National Guard.

There can be no criticism of the proximity-warning capability of the Atkins light, nor of its ability to indicate relative heading, only of the recommended location of the light units on the aircraft.

• **The problem**—The recommended wingtip installation is such that both tip lights can be seen throughout a

Better Aircraft Lighting System

FLASHING RATES assigned to specific zones to provide danger information.

considerable portion of the 90° "collision zone" arc. This could lead to confusion.

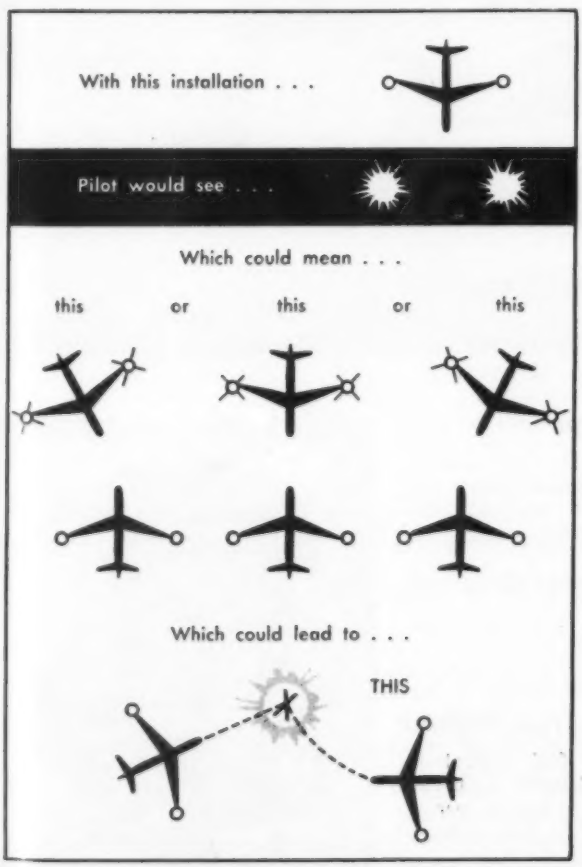
For example, suppose a fast-moving aircraft has emerged from clouds at night and is found to be closing with a slow-moving plane crossing from left to right at, say, a 30° angle. Because the Atkins light is not colored, the pilot of the faster aircraft would have difficulty establishing rapidly whether he is looking at the right or left side of the slower one, or whether it is approaching head-on. He probably would turn to starboard—and this might lead him onto the very collision course he was trying to avoid.

The solution, it would seem, would be to install two Atkins lights, spaced well apart, on the left side of the fuselage and one on the right side. One or more lights would be seen from any direction. The number of lights seen combined with the flashing frequency immediately would establish the relative headings of the aircraft.

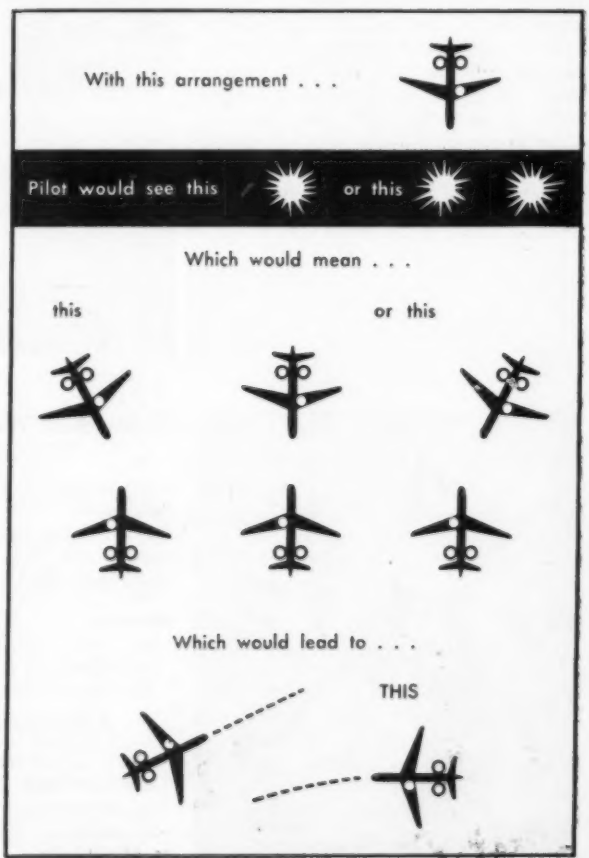
A pilot seeing two lights still might not be quite sure of whether he was approaching head-on or seeing the left side of the other aircraft at an angle. But he would turn to starboard in either event and this would be the correct evasive action.

The Atkins light is installed on not more than 15 airline and corporate aircraft. CAB has not bothered to approve its use on a grand scale because airlines have not placed large orders nor demanded its adoption. On the other hand, airlines have been wary of placing orders for equipment not approved by CAB.

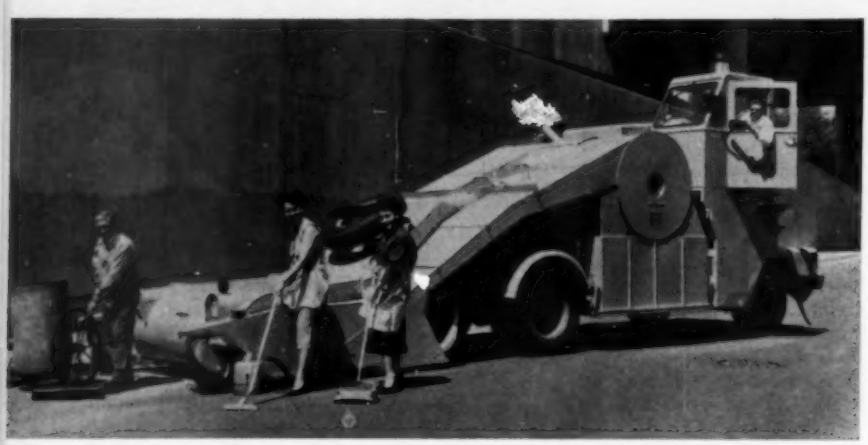
However, the Las Vegas and Brunswick, Md. collisions between military jets and airline transports have jolted operators into action. Orders for additional Atkins lights have been placed by some operators now using them. The company is requesting CAB permission to extend installations beyond the maximum of 15 presently authorized.



ONE LIGHT ONLY mounted on each side of the aircraft fails to distinguish port from starboard. This could lead to confusion.



TWO LIGHTS to port and one on the starboard would supplement and give better positioning than existing lights.



Vacuum Sweeper

Consolidated Diesel Electric Corp.'s new airport and highway vacuum sweeper is designed to clear runways, ramp areas, etc. of debris ranging from sand to empty bottles and large steel wrenches at the rate of 1,000,000 sq. ft. per hour. The 30½ ft. long, 11 ft. high machine sweeps a path 8 ft. wide at speeds up to 25 mph. En route speeds to 35 mph can be attained by the 15,000-lb. vehicle. To date, the company has contracts for 23 units at $28,500 each. Machine also is available on a rental basis.

Circle No. 115 on Reader Service Card.

Headrest Covers

Use of Dura-Weve towels and headrest covers is saving Continental Air Lines an average of $500 a month, according to **Scott Paper Co.,** manufacturer of the new material. Dura-Weve is made by laminating rayon scrim to two outer plies of high wet-strength paper. It is lint-free and comes in a variety of colors.

Circle No. 100 on Reader Service Card.

Calendar Watch

New 17-jewel, 12-hour calendar chronograph by **Wakmann Watch Co., Inc.** keeps track of day, date and month. Three registers: 60-second, 30-minute and 12-hour.

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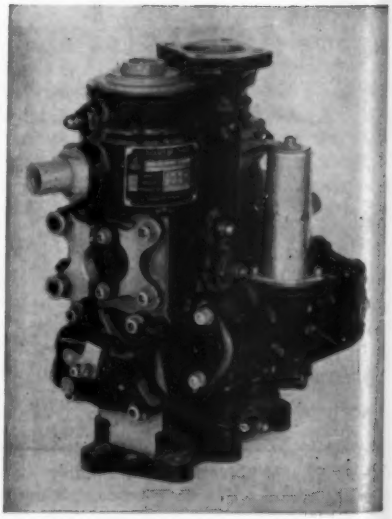

Afterburner Fuel Control

New afterburner fuel control by **Chandler-Evans** is designed to handle fuel requirements to 35,000 lbs. per hr. and maintain 2% fuel flow accuracy to 60,000 ft.

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→

Heavy-Duty Tractor

New tug being produced by **Kenworth Motor Truck Co.** is designed to move aircraft weighing from 100,000 to 400,000 lbs. at speeds from 3 to 10 mph. Unladen speeds to 30 mph can be attained, company says. Pulling capacity can be raised or lowered by use of dash-controlled two- or four-wheel drive. Vehicle weight can be varied from 30,000 to 43,000 lbs. by use of ballast. Smooth drawbar pull is attained by using a three-speed torqmatic transmission and a hydraulic torque converter. Maximum height over either end of tug is 63½ inches.

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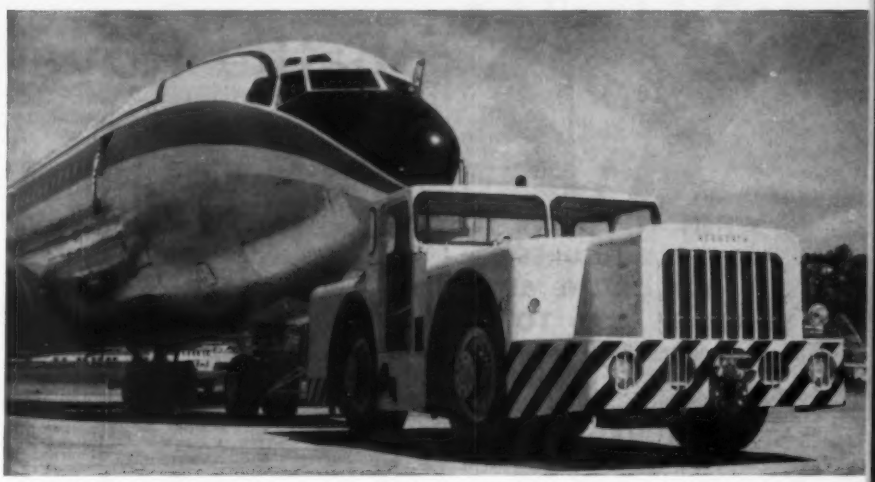

Water Boil-off Cooler

System designed by **Eastern Industries, Inc.** to cool airborne electronics packages circulates refrigerated air over hot components. This air, now heated, is passed through vapor-cycle refrigeration system to water boil-off condenser.

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Invalid Chair

Designed by **Washington Products Co.** in consultation with Eastern Air Lines, lightweight (24 lbs.) invalid chair can be used in narrow aircraft aisles and can be maneuvered in confined spaces to eliminate hazardous transfers of the passenger.

Circle No. 114 on Reader Service Card.

Lightplane Radio Compass

Designed for private pilots by **Aircraft Specialty Lines, Inc.,** a radio compass permits homing on radio range stations and radio beacons from 200 to 450 kcs and standard broadcast stations in the 550-1,600 kcs band. Unit, weighing 9.14 lbs., consists of an eight-tube superheterodyne tuner, a vibrator-type power supply capable of being mounted without shock mounts, an indicator and a ferrite loop.

Circle No. 110 on Reader Service Card.

Electric Motor

A 28-volt dc motor produced by **Hoover Electric Co.** produces 2 hp at 3,000 rpm. Motor is equipped with a brush-holder designed to provide even brush pressure over the full wear range, producing even power output and permitting high altitude operation without excessive brush arcing.

Circle No. 111 on Reader Service Card.

Oxygen Supply Pump

Integral motor positive displacement pump has been developed by **Task Corp.** Similar in design to a Roots blower, rotors of the drive motor form the pump rotors. Stators are inside the rotor, a reversal of the normal configuration.

Circle No. 104 on Reader Service Card.

Portable Electric Generator

Direct-coupled portable electric generator has a capacity of 2.5 kilowatts and supplies 115 volts dc. Developed by **Construction Equipment Div., Thor Power Tool Co.,** the generator is driven by a single-cylinder, four-cycle gasoline engine. Package weighs 165 lbs. (dry) and measures 31¼″ long, 20″ wide and 19½″ high.

Circle No. 103 on Reader Service Card.

Sun Visor

Transparent plexiglas sun visor is designed by **Aircraft Components, Inc.** to replace original non-transparent visors in all Beechcraft, Piper and Cessna aircraft. Fully adjustable, visors come in two colors, green and blue.

Circle No. 107 on Reader Service Card.

Generator dolly

A two-wheel dolly weighing 15 lbs. is offered by **Pacific Mercury,** for easy wheeling of the company's portable generator model up to 4.5 kw.

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Battle Royal Shaping Up f

by Albert W. Bentz
Manufacturing-Military Editor

There's a big battle shaping up between the petroleum and chemical industries over who will supply aircraft fuel a decade or so hence. The era of high-energy fuels isn't here, but it's on its way.

One oil official commented that high-energy fuel means many things to many people, but "to the fuel supplier it means a material one of his competitors has developed to take away his customer's business."

The chemical industry has won the first round with receipt of $75 million in initial developmental contracts from Air Force and Navy. These are Olin Mathieson Chemical Corp. for production of its HEF-2 and 3 and Callery Chemical for its HiCal fuel. These are scheduled for the North American B-70, but there is some suspicion the big bomber will use regular JP-4 with additives, at least initially.

To offset the possible deep inroads into its highly-lucrative jet fuel market (it is estimated that military use of JP-4 will surpass avgas volume by 1960), practically all the major oil companies have enlarged their own chemical departments and are trying as vigorously as the chemical companies to come up with some answers to the very tough problems of finding and *using* the "exotic fuels."

• **State of the art summary**—Summarizing the situation as it is today, Robert A. Wells, former fuels and lubricants test engineer at Curtiss-Wright and now staff engineer for the Marketing Technical Service Division of Gulf Oil's Research Center, predicted that fuel from petroleum "will continue to provide push for the largest tonnages of weapon systems, including the proposed atomic bombers, and all the commercial energy requirements for many years to come."

Wells even doubts that the B-70 chemically-fueled bomber will be ready for the "big step to exotic fuels." He believes JP-4, plus petroleum industry-produced hydrocarbons, will be handed the job. He conceded, however, that it would be possible to use a high-energy fuel in its afterburner or ramjet stage (indicating that the GE J93 may be a dual-cycle engine).

A high-energy turbine fuel would have to have a higher Btu per pound and per gallon at a lower cost than Turbine Fuel A (jet kerosene) if it were to be used in transports.

"Next year's (commercial) airplanes and engines are designed, built and some are flying now," Wells said, "therefore, a high-energy fuel suitable for their use would have to be compatible with the present hardware." He pointed out that about 40% of the direct operating cost for turbine-powered aircraft is fuel cost, and added that no high-energy versions are being offered or contemplated in the price range of Fuel A and JP-4.

• **Why better fuel is needed**—Other advantages, however, make the search for better fuel worthwhile. To the engine manufacturer, for instance, high-energy fuel means that today's and tomorrow's jets could produce more power per pound of weight than with any fuel currently available. To the airframe manufacturer, it would mean smaller tanks could carry more power yet provide the same range. To the airline, it would mean more payload over longer distances.

For high Mach military aircraft, thermal stability of fuels (those resisting change from outside sources of heat) is one of the most important characteristics. Wells says tests run by oil companies, testing labs and Wright Air Development Center have led to the conclusion that saturated cyclic hydrocarbons are more thermally stable than straight-chain hydrocarbons and, therefore more desirable as high-temperature fuels.

Wells concedes that petroleum products, which are mixtures of straight-chain, branched-chain and cyclic hydrocarbons, "are not the ideal solution."

"As a step toward a more thermally stable fuel than JP-4," he said, "the Air Force has set up requirements for JP-6, which is a special cut and more thermally stable petroleum fuel with less severe freeze-point requirements. A further proposal to incorporate 'close definition of properties' by more closely defining the boiling range of JP-6, and therefore aircraft performance, is a very narrow cut called JP-6H (H for 'heart cut')."

• **Navy breakthrough recalled**—Most widely publicized high-energy fuel program was Navy's "Zip" project, started in 1952 and joined by Air Force in 1955. This program, based on diborane, resulted in a major fuel tech-

fuel Dollars

nology breakthrough in the form of a new series of boron-carbon-hydrogen compounds retaining much of the high energy of the boranes but more stable, less toxic and higher density. Boron hydrides closely resemble these B-C-H fuels and are expected to play a part in HEF and HiCal.

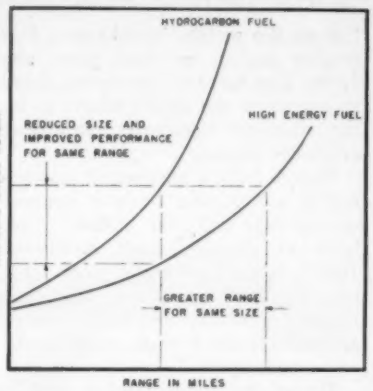
Among other materials being examined for tomorrow's fuels for jet engines are decalin, perhydrofluorene and perhydropehenanthrene, perhydrofluoranthene and isopropylbicylohexyl (all hydrocarbons), Wells said.

In the present state of the art, however, here's how Wells summarizes high-energy fuel performance compared with present fuels:

• Turbine engines can produce more power at higher altitudes when operated on hydrocarbon fuels having higher Btu/lb. The airplanes they power have longer range when the fuel has more Btu/gal. Hydrocarbon fuels from petroleum do not increase both of these heat units at the same time, but synthetic polycyclic hydrocarbons do.

• Afterburners of turbine engines, acting like ramjets, have greatly improved thrust with the use of boron-type fuels, in spite of the corrosive and heavy metallic ash exhaust products.

• Ramjet engines can operate at higher altitudes and speeds with pyrophoric fuels (liquids that ignite spontaneously in air), which eliminate the problems of flameout; but the fuels are toxic in the extreme, ignite in air and some explode in contact with water, therefore will require a new concept in fuel-handling. He also sees this fuel as a possible standby for relighting flamed-out jets.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HIGH ENERGY FUEL
REDUCED SIZE AND IMPROVED PERFORMANCE FOR SAME RANGE
GREATER RANGE FOR SAME SIZE
AIRPLANE GROSS WEIGHT
RANGE IN MILES

RELATIVE PERFORMANCE of hydrocarbon fuels as compared with high-energy fuels.

ASE Allows 'Hands-Off' Copter Flying

Not so long ago, several military helicopters were busy hovering when a newcomer swept into their midst and proceeded to hover with them. Then, to the horror of the pilots in the original group, the pilot of the new helicopter nonchalantly hung his feet over the side and gaily waved a greeting—with both hands. He had no co-pilot.

A little more than not so long ago, this would have been the prelude to the most prodigious fall since Icarus' wings melted. But today it's far from fantasy—the helicopter was equipped with Sperry Gyroscope Co.'s new Automatic Stabilization Equipment (ASE) system.

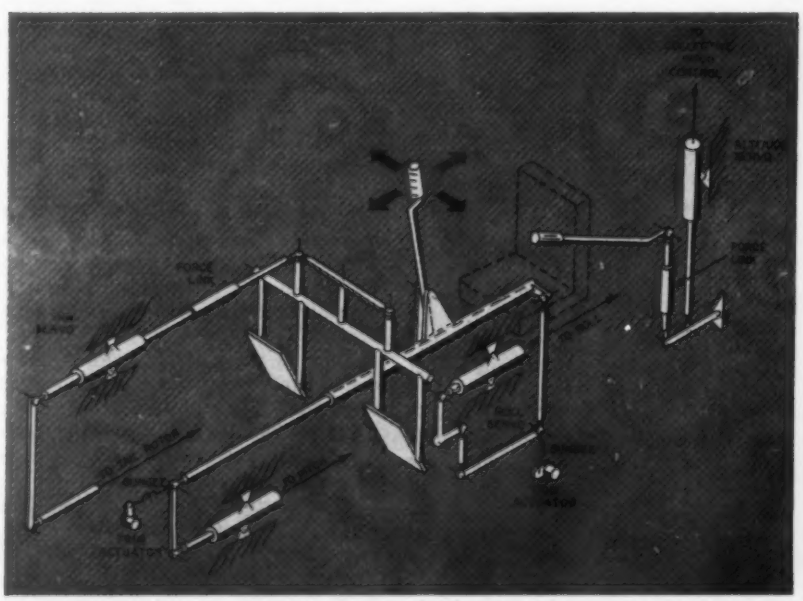
Sperry developed this latest version of their ASE in close cooperation with Vertol Aircraft Corp. and a breadboard unit has been put through extensive flight tests installed in Vertol's HUP-4 helicopter. This application was evaluated by the U.S. Navy to determine its adaptability to Vertol's H-21 (Vertol designation Model 44) Shawnee. Since then, the ASE has been selected by the Royal Swedish Navy for installation in four Model 44s it has purchased for anti-submarine work.

The system, taking its commands directly from the pilot's controls, is designed to provide roll, pitch, yaw and altitude stabilization. In addition, it affords all-speed, automatic turn coordination, hover drift compensation and automatic pitch reduction in the event of rotor underspeed. However, the pilot can override the ASE at any time in case of malfunction, etc.

• **Pitch and roll control information** originates with a vertical gyro in the control and amplifier unit. Signals from the amplifier are fed into hydraulic stabilizing servos which are unitized with hydraulic control actuators to provide a differential system.

The end result is that the ASE's longitudinal and lateral stabilizing control motions are not apparent at the cyclic stick. By replacing the existing bungee with a bungee pick-off, Sperry allows the pilot to maneuver the helicopter with ASE engaged or disengaged while maintaining normal stick "feel".

Yaw control originates in the helicopter's directional gyro system. Signals are amplified and fed into hydraulic servos connected in parallel with the rudder pedals. Consequently, the ASE's directional stabilizing motions are felt by the pilot. However, he may leave his



SCHEMATIC shows manner in which Sperry Automatic Stabilization Equipment is hooked into helicopter's control system. If machine is equipped with a suitable compass system and hydraulic actuators, ASE's chargeable weight is only about 35 lbs.

feet on the pedals. Thanks to a force-sensing device, he must plant about 15 lbs. foot force on the pedals in order to overcome the ASE's efforts to keep the helicopter heading in the direction originally chosen.

Signals from a barometric sensor are fed to a hydraulic actuator connected in parallel with the collective pitch lever to afford altitude stabilization. Here's where automatic pitch reduction enters the picture. This circuit features a hookup which automatically reduces collective pitch in the event of rotor underspeed.

When the rotor reaches a pre-set minimum rpm, the collective pitch is activated to drop to an optimum autorotative position.

When a borderline rotor rpm situation is experienced, the ASE has a "stick-shaker" effect upon the collective pitch lever, warning the pilot that he is about to experience that "sinking feeling."

• **How coordination is accomplished**—The automatic turn coordination feature of the Sperry ASE is accomplished by feeding yaw signals to the directional control system when cyclic is displaced laterally at airspeeds over 40 kts.

Lateral and longitudinal accelerometer signals are used to provide hover drift compensation. In the event that the operator has coupled navigational and positioning equipment such as Doppler, Decca, ILS, etc. into the system, these aids would prevent drift when hovering. Under such circumstances, the accelerometers could be eliminated without detriment to the system.

A four-way, thumb-operated beep switch on the cyclic stick enables the pilot to trim the helicopter to the desired attitude in the pitch and roll axes. When the pilot releases the controls after completion of a maneuver, the helicopter will return to the attitude originally selected.

An ASE disengage button also is located on the cyclic stick. The ASE can be disengaged or engaged at any time, even during steep maneuvers, without disturbance. A warning light flashes when the system is disengaged but standing by.

Adding only about 35 lbs. to the weight of the helicopter, the hydraulic and transistorized control system has been designed with an eye to ease of field maintenance. Replacement components are simply plugged into the system, which is fabricated on a modular basis. In addition, use of printed-circuit calibration cards eliminates manual adjustments and, at the same time, permits application of the ASE to any helicopter.

'Moly' May Mean Long Jet Life

The use of molybdenum for some high-temperature components in turbojets may hold the key to longer engine life and greater efficiency.

Results of a four-year program with its "hot rod" J47 powerplant have convinced engineers at the Aircraft Gas Turbine Div., General Electric Co., that molybdenum components are readily producible and engine evaluation to 2,000°F is feasible.

The company embarked on the program in 1954 with the single purpose of evaluating molybdenum as a possible material for turbine buckets in hopes of reaching higher turbine operating temperatures with an accompanying increase in efficiency.

A complete engineering "package" was required for the project. It was necessary to fabricate the moly turbine buckets, develop and evaluate protective coatings for the parts, and prove this thinking in a test vehicle.

Selecting 0.5% titanium molybdenum (0.5%TiMo) alloy as the material, GE designed the turbine buckets as identical to the original J47 design in airfoil configuration, but incorporated a longer dovetail shank. The longer shank allowed cooling air to pass over the turbine wheel which would operate at several hundred degrees over the normal 1,500-1,600°F temperatures.

Production problems in fabrication were solved by conventional means, no "exotic" techniques were necessary. About 2,000 turbine buckets were produced in all, but only about 1,200 actually underwent engine testing.

The J47 was modified in the exhaust section and tail cone, to take care of higher temperatures, and a high-delivery fuel system was fitted. Modifications to the turbine wheel consisted of passages to supply cooling air to the wheel rim, and an air guide disc to route cooling air to the rim where it circulated between shanks of adjoining buckets.

To cool the turbine stator (nozzle diaphragm), shop steam was supplied to the L-605 blades. No attempt was made to cool the L-605 transfer lines of the hot gas ducts, but they were stiffened.

Because turbine bucket temperatures were the important engineering parameter, they were instrumented with six thermocouples. Five thermocouples were installed on the turbine wheel. Leads to this instrumentation were made of nichrome wire spotwelded to the wheel.

The first serious problem in early engine testing was a cracking of the dovetail shanks on the moly turbine buckets. Examining the parts after each test, the cracks were found with alarming frequency, according to R. C. Downey, metallurgist at GE's Flight Propulsion Lab.

Charging off the problem to overstress, the engineers recalculated the dovetail stresses and decided that their original figures were "marginal." After lowering operating speed from 7,900 rpm to 7,000 rpm, the cracking continued. When three buckets failed completely just after a lightoff with no abnormal temperatures or overspeed, a complete metallurgical study was instituted.

It was discovered that 0.5%TiMo suffered an almost total loss of ductility in simple tensile tests below 200-300°F, and a drastic loss of strength in the same temperature range when it was notched as in the dovetail tang. Chrome plating of the dovetails was eliminated because it apparently could not yield to tang loading—producing a stress concentration situation that could cause failure. Nickel plating was substituted.

Overtemperature was also a problem. When a fuel control failed, temperatures of the moly turbine buckets rose to between 2,300° and 2,400°F. The protective coating burned off, proving that coatings with higher melting points were required to provide for transient temperatures.

In one case of input damage during tests, a bolt passed through the turbine area, badly damaging the moly buckets. The powerplant continued to operate and the mishap was not discovered until teardown after test completion.

Deterioration of the turbine nozzle was another problem, particularly in the trailing edge of the turbine nozzle partition. This created serious bucket damage, but was eliminated by increasing the coolant flow.

Protective coatings for the moly against high temperature oxidation is another subject, and some of the results with specific materials are still under security wraps. But, according to M. A. Levinstein, supervisor of coatings and surfacings at the company's FPL, his section experimented with more than 15 different types, processes and combinations of coatings.

The "hot rod" J47 has achieved more than 500 hours of endurance testing in its total operation since 1954. Not all the answers are in yet, but GE believes that its approach shows considerable promise.

CAPABILITIES . . . Manpower, Tools and Experience

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The Inside Story of the Aviation Act

Why Sen. Monroney decided time was ripe to get action on much-discussed Federal Aviation Agency

by Robert Burkhardt
Transport Editor

It was well past midnight and the lights were still burning brightly a few weeks ago in a small room high up in the Senate Office Building. Acrid cigarette smoke filled the high-ceilinged room as aides hurried in and out, legal assistants pored over carefully wrought legislative phrases and a small coterie of professional and volunteer advisors argued policies.

The Federal Aviation Act of 1958 was being drafted.

Inspiring the intense and dedicated group of aviation and legislative experts was Sen. A. S. Mike Monroney, Democrat from Oklahoma, Chairman of the Senate Commerce Committee's Aviation Subcommittee and long-time friend of aviation. A patient man, skilled in the delicate art of piloting legislation through Congress, Sen. Monroney had concluded only 24 hours earlier that the time had suddenly become right to obtain congressional approval of a new Federal Aviation Agency.

What led to this decision to suddenly jam the throttles forward and kick off the brakes? Idea of a Federal Aviation Agency has been taxiing around for several years. Why did Sen. Monroney decide that this particular time was right for takeoff?

It could be said that everything argued against such a decision. Congress a year ago had passed a law directing the president to look into the FAA idea and present appropriate legislative recommendations to the new Congress next January. In the rococo old Executive Office Building next door to the White House, Presidential Assistant Elwood Quesada and a small staff were busy interviewing government officials, airline presidents and others interested in aviation affairs. (See AMERICAN AVIATION, May 19, p. 25: "A Look Ahead at FAA's Potential.")

Although bills to establish an independent government aviation agency—as contrasted to the sprawling Civil Aeronautics Administration that takes up nearly half the Commerce Department's nest of bureaus and subagencies—had been introduced in previous years, no bill was pending in either the Senate or the House.

This somewhat placid legislative situation could be attributed to an attitude summed up by the words: "Let's see what the White House comes up with first." It might very well have continued through the end of this present session, except for five people: the four pilots of the military jets and commercial airliners that crashed in recent weeks, and Sen. Monroney, who determined that those who perished in these tragic accidents should not have died in vain.

• **One-agency rule essential**—There can be no real solution to the air safety problem until responsibility for air traffic control is centralized in one responsible agency. As it is now, there are two traffic control groups operating: military and civilian. This stems from the Civil Aeronautics Act, passed by Congress in 1938 to establish control over the "civil airways." Military traffic, unimportant at the time, isn't even mentioned in the 20-year-old law.

Today more than half of all air traffic is military. In the case of high-speed jets, virtually all of it is military. Tragic air crash experiences have reinforced what sensible men have been saying for several years: Responsibility for air traffic control must be vested in one federal official—not divided between two large cabinet agencies.

There has been no real dispute over this. Only question is one of degree. Should the military give up all control over its routine air traffic to a strictly civilian agency? Or, at the other extreme, should the agency be a half-way house, staffed with interchangeable civilian and military air traffic control specialists? (So far as can be learned, no one—not even the most extreme Air Force empire builder—has had the temerity to suggest military control of any civilian air traffic, except in time of war.)

• **Feared hasty, ill-conceived bills**—These questions and others were being carefully worked out by Quesada and his select staff when Sen. Monroney made up his mind to move. As he now describes it, the decision was based, in part, on a real fear, particularly after the second recent air crash, that a number of hasty and ill-considered bills might be introduced by understandably angry and impatient members of both Houses. Sen. Monroney's concern was shared by Rep. Oren Harris (D-Ark.), chairman of the

Federal Aviation Act of 1958

Principal provisions of S. 3880, the proposed Federal Aviation Act of 1958:

- Creates an independent Federal Aviation Agency, responsible to the President and the Congress. It will be headed by a single civilian Administrator, who shall have prior aviation experience.
- Gives the Administrator authority to regulate the use of all airspace over the United States by both civil and military aircraft, and to establish and operate a unified system of air traffic control.
- Provides for the appointment by the Secretary of Defense of a Special Military Advisor to the Administrator, to advise the Administrator on special problems of military aviation.
- Transfers to the new agency the responsibilities now assigned to the Civil Aeronautics Administration and the Airway Modernization Board.
- Transfers to the new agency the present responsibility of the Civil Aeronautics Board for making and enforcing air safety rules, but provides for appeal to the Board from orders of the Administrator in certain instances.
- Leaves in the Civil Aeronautics Board its present responsibility for economic regulation of civil aviation, and for accident investigation.
- Authorizes the Civil Aeronautics Board to request the President to appoint public members to special boards of inquiry to investigate major air accidents.

House Interstate Commerce Committee, who was kept advised of developments.

"We were able to move as promptly as we did because a lot of ground had already been covered by the Aviation Subcommittee staff," Sen. Monroney said in an exclusive interview with AMERICAN AVIATION. "When the second mid-air collision shocked the country, we changed from a dry-run (which would also have involved drafting a bill and holding hearings) on a Federal Aviation Agency bill to an all-out effort to get the bill passed."

This decision was made on the afternoon of May 20 only a few hours after the National Guard training jet collided with the Capital Viscount shortly after takeoff from Baltimore's Friendship airport.

By working late that night and into the following morning, the bill was drafted in time for introduction in the 21st. As finally written it totaled some 51 pages of detailed amendments to the Civil Aeronautics Act.

What kind of a bill is S. 3880? It is a good bill, in the opinion of almost everybody who has read it. There are objections, of course. Some important airway users were not consulted in the night-long rush and changes will have to be made. Sen. Monroney is prepared for this.

The Air Force, for example, was still working out its internal policy on the Quesada plan for a Federal Aviation Agency and, for this reason, was not consulted by Sen. Monroney and his staff in the course of the night-long bill-drafting session. As introduced, the bill provides that the Defense Department submit to FAA airways control. At the same time the Air Force is to be represented in the agency only by a single "advisor." Final bill will almost certainly provide for more direct operational participation by the AF.

• Final draft may be different—There is also controversy over whether the FAA should be transferred to the Defense Department in time of war. This is written into the present draft of the bill, but is very likely to be changed when a final draft is marked up for Senate action.

Nearly half the members of the Senate have either formally endorsed the bill as co-sponsors, or indicated that they will support it later on the floor. In the House, some turbulence is expected, though the endorsement of Rep. Harris will provide a powerful boost towards passage.

In the public hearings that started two weeks ago, witness after witness from the airline industry, from airline labor, and from private and business users of airline space testified in support of an immediate Federal Aviation Agency. Many had doubts about various technical details of the bill, but there seems such general agreement on the basic idea that Sen. Monroney's hopes for passage at this session seem well founded.

There is somewhat less enthusiasm from government witnesses, particularly from agencies who stand to lose functions, responsibilities and budget to the new FAA. No official wants to go on public record against improved air safety—particularly with a Presidential message in support of the bill expected.

• Durfee would lose power—James R. Durfee, chairman of the Civil Aeronautics Board, stands to lose the job of issuing safety regulations if S. 3880 passes. Instead the CAB would be a court of appeal from the safety regulations issued by the FAA. Chairman Durfee is not happy about this. "In the 20 years of the present act, the passenger fatality rate measured in passenger miles, dropped to 1/45th of the 1938 rate," he points out. "We are hopeful, and confident, that the existing safety machinery that has been this country's main line of defense in air safety for twenty years—and a very effective defense—will not be swept away in a futile hope that magic solutions will result."

New Routes, New Blood fro

by Eric Bramley
Chief News Editor

DENVER—Two recent developments have brightened the future for Frontier Air Lines.

First, control of the local service line is now in its own backyard—the Rocky Mountain area—in the hands of Lewis B. (Bud) Maytag.

Second, the Civil Aeronautics Board has awarded Frontier several new routes in the Seven States Area Case—some of which give it the entry into large traffic-generating areas that it needs. The routes will increase the size of the FAL system by a whopping 72%.

Control of FAL probably has changed hands more than that of any other local line. For most of the com-

SMALL AIRLINE, BIG TERRITORY—New routes awarded Frontier Airlines by CAB increase already large territory it serves by whopping 72%.

Industry is also somewhat concerned over the divided responsibility for safety rules that will result from the proposed new law, but is prepared to back up Sen. Monroney's try for a score at this session nonetheless. "We set great store by this legislation," says Air Transport Association President Stuart G. Tipton. "We think It will solve problems that have plagued us and other users of the airspace for a long time."

Or, as Sen. Monroney told his weary staff the morning after the ordeal, "If we succeed in writing a good bill, one that everybody who has been working for a Federal Aviation Agency can support, we will save two years' time and an untold number of lives."

frontier

pany's life, this control has been in Chicago. Bud Maytag made his purchase of 290,000 shares, or 65%, from Chicago interests. And the general feeling at FAL is that the return of control to the Rocky Mountain area is a good thing.

• **Maytag, 31-year-old son** of the washing machine manufacturer, has been in aviation for some 10 years in Colorado Springs, less than a half-hour flight from Denver. He has operated a GI flight school and has conducted refueling operations under contract for the military.

Maytag leaves little doubt that he intends to work at the local airline business. He will become chairman of FAL's board. He will replace four directors, including those from which he bought control—and he will replace them with men from cities on FAL's system.

Asked why he had decided to enter the local service industry, which has not exactly been noted for its large profits, Maytag told AMERICAN AVIATION that he has considerable confidence in the industry's future. He believes that one objective must be the elimination of subsidy, although he admits this won't be easy.

He added that he had been trying to gain control of FAL for five years, believing that the airline has a good potential. He bought in before CAB's announcement of the new route awards to FAL, and at that time remarked that the carrier needed some additional routes. The awards no doubt strengthen his conviction as to the company's potential.

FAL's growth, although not the

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Frontier's Lewis B. Maytag

most spectacular in the industry, has been steady. In 1957, it carried 213,446 passengers, up 67% in five years. In the same period, passenger-miles increased 77%. Today, in the local service industry, FAL is:

- First in available ton-miles used.
- First in penetration of population —passengers per capita.
- First in aircraft utilization.
- First in airfreight tonnage (36% of the total local service freight).
- Second in mail tonnage.
- Third in percentage of completion of scheduled miles.
- Seventh in revenue passenger-miles.
- Seventh in scheduled miles flown.

Although seventh place in passenger-miles may seem to leave something to be desired, John Lindsay, Frontier's v.p.-traffic and sales, says he's almost as proud of this position as he is of any of the "firsts." And he points to one of FAL's basic problems—sparsity of population. The average of the local service industry is 2,700 population per route mile. The highest is 9,000. FAL has 306.

What population there is has been penetrated. Cortez, Colo., for example, puts passengers equivalent to 160% of its population aboard FAL airplanes in a year. Close behind are Farmington, Flagstaff and Grand Junction.

Sparse population was a factor contributing to FAL's recent plea to CAB for a subsidy increase. It cited a "substantially worsening" financial situation and a rapid increase in operating costs.

• **Subsidy bill going up**—C. A. Myhre, FAL president, points out that FAL is subsidized to the tune of $2.5 million a year and that the bill is going up. "It's our duty to do everything in our power to reduce subsidy and to become self-sufficient—but the sparseness of population and the relatively few big traffic centers we serve have made it difficult to develop traffic.

"We must be permitted to participate in terminal traffic—long-haul between large traffic centers. Frontier isn't trying to become a trunkline—far from it. We'll probably be operating some DC-3s for a long time. But we need operating flexibility to offset subsidy needs on sparse segments.

"A new airplane in itself isn't the answer to the problem. We must be able to operate a new airplane over economic stage lengths."

In the Seven States Case, CAB's "press-release" decision (formal decision to be issued later this summer) awarded FAL southern, central and northern Nebraska routes, including an entry into Omaha. It also received an Omaha-Kansas City route via intermediates, plus three other routes.

This decision will have a major impact. It adds 27 new cities to the FAL system. Present route mileage of 3,617 will increase to 6,237. Number of employes will jump from 714 to more than 1,000.

The big expansion will, of course, increase the subsidy bill. But FAL's contention has been that this bill must get bigger before it gets smaller—that new cities must be added and developed.

In line with its argument that it needs longer hauls on its present system (average stage length is now 91 miles, average passenger haul 270 miles) FAL is encouraged by a CAB examiner's report in another case, recommending it for nonstop rights between Grand Junction and Denver for a three-year period.

• **New equipment under consideration**—At this writing, FAL is considering a new equipment program. It now operates 16 DC-3s and has no commitments for new planes. At one time, it signed a letter of intent to buy Fairchild F-27s but canceled the deal because Rolls-Royce R Da6 engines were not powerful enough.

FAL must have an airplane that can haul a respectable payload from high fields and over high terrain. Several of its fields are more than 7,000 ft. above sea level and, as one company official puts it, "we land and take off higher than some airlines fly."

With introduction of the more powerful R Da7 engine, the F-27 is back in the running. In addition, FAL has been studying the Convair 240, 340 and 440 and the following turboprops: local service version of the Viscount, the Napier Eland Convair and the Allison Convair.

Maytag has been devoting major attention to this equipment program.

How Will Jet ff

by Joseph S. Murphy

The tough task of solving today's air traffic control problems is without question the Number One headache facing CAA engineers. But if these same engineers had been as well equipped five years ago as they are for upcoming jet operations, today's loud noises about ATC shortcomings might have been little more than whispers.

With airline jet flying still some five or six months away, CAA specialists already have under their belts thousands of hours of simulated operations in traffic conditions matching the worst to be anticipated for the next five years.

Should jet aircraft receive priority ATC treatment? Or should they be handled just the same as other aircraft? CAA simulation exercises show that neither should be the case, but instead some middle-of-the-road approach is not only possible but desirable from the systems standpoint.

This point was brought home quite clearly by Tirey K. Vickers, airways operations specialist of CAA's Indianapolis Technical Development and Evaluation Center, recently during the National Conference on Aeronautical Electronics at Dayton.

One by one, Vickers took each new facet of the jets and analyzed its impact on present-day ATC practices. He brought the Institute of Radio Engineers session these results, not necessarily reflecting final CAA decisions, but at least the thinking as it has progressed to date.

• **Speed**—Higher speeds will mean higher rates of closure between aircraft, lower turning rates and less economical use of airspace. There will be less time for ATC controllers to handle their normal workload. The mechanics of processing and posting flight information will have to be accelerated whereas the time available for communications will be diminishing.

The result: the biggest task facing controllers will be one of getting used to the stepped up tempo of operations —of staying ahead of the airplane.

• **Economics**—The inherent high-speed, high-altitude characteristics of efficient jet operations don't necessarily agree with the principles of ATC traffic separation as they exist today. On paper, the optimum operating altitude should increase with fuel burn-off at a rate

Jet Affect Traffic Control Problems?

of about 50 feet per minute, but wide-scale use of such a "drift-up" technique by airline operators would practically rule out the use of altitude separation as it exists today in traffic control.

(Visualize a jet starting its westbound transcontinental cruise at 32,000 ft. and drifting up through eastbound traffic levels, etc. to control economy.)

Vickers reports one possible solution that CAA presumably might live with, the use of a stepped climb. Simulation studies show that the use of a single 4,000-ft. step or two-level cruise on a typical coast-to-coast flight would inflict a penalty of 3% in fuel consumption over the drift-up technique.

By another approach, using three 2,000-ft. steps, the aircraft remains closer to its efficient altitude and suffers less than a 2% fuel penalty, Vickers said.

• **Terminal operations**—The problem of getting jets out of high-density airports up to their desired operating altitudes at the least economic penalty is no simple one. In some instances it will mean "tunneling" aircraft at low altitudes until clear of local restrictions. In others it will mean detours in off-course directions before finally proceeding on-course to destination.

According to Vickers, results of simulation studies so far will give controllers these guidelines to follow in handling jets:

• Tunnel altitudes should be as high as possible and the length of the tunnel should be as short as possible.

• Detours represent wasted mileage with high penalties in fuel and flight time. A 100-mile detour could amount to 13 minutes lost flight time and 2,650 lbs. of fuel wasted.

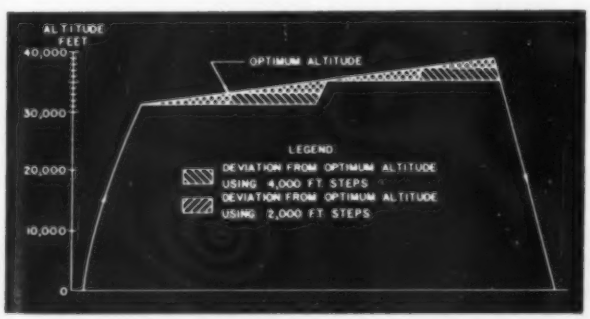
• Significant fuel penalties result if aircraft speed within a tunnel must be reduced for any reason, although in some instances the problem of overtaking other aircraft may require jets to slow down while tunneling through congested areas at low altitudes.

• **Cruise restrictions**—The high fuel consuming nature of jets is not the only problem facing ATC planners in cruising operations. Inherent errors in altimeter systems dictates 2,000-ft. vertical separation of jets flying above 29,000 ft. compared to the 1,000-ft. separation at lower levels. This immediately cuts in half the number of cruising levels available in the altitude region where the airlines will want to operate their jets.

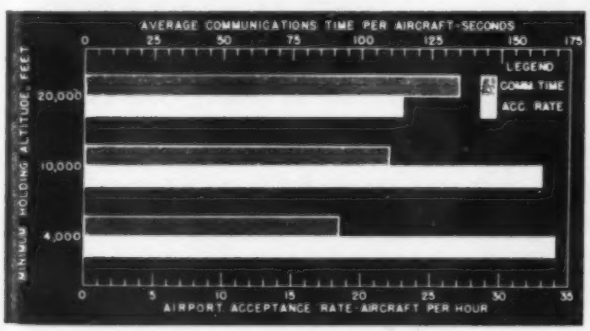
• **Holding operations**—One of the more significant findings in CAA's simulation exercises disputes the long-standing concept that jet aircraft should be held at high altitudes (20,000 ft. and above) and be given an irrevocable landing sequence before descending.

Instead, the CAA dynamic simulation tests showed that airport acceptance rates can be increased if jet holding altitudes are at lower levels. Using a 100% sample of jets fed into an airport from altitudes of 20,000, 10,000 and 4,000 ft., CAA found that the aircraft acceptance rate was 23, 33 and 34 aircraft per hour respectively.

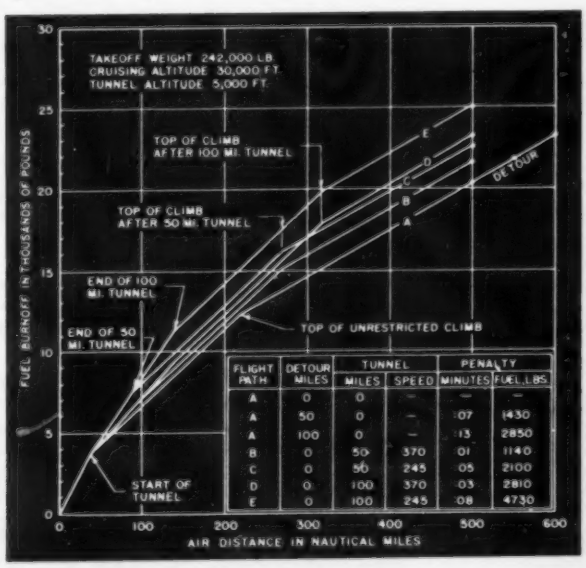
In the same tests, the pilot-to-controller communications time per aircraft declined from an average of 135 seconds when approaching from 20,000 ft., to 110 seconds from 10,000 ft. and only 90 seconds from 4,000 ft.



TUNNELS, DETOURS AND DOLLARS. Results of CAA simulation studies show the penalties in lost time and wasted fuel to be faced in routing jets from takeoff to cruise altitude. →



THE CRUISE PROBLEM. How jet operations might be planned with two-level or three-level climb operation instead of the more economical "drift-up" approach. ←



FLIGHT PATH	DETOUR MILES	TUNNEL MILES	TUNNEL SPEED	PENALTY MINUTES	PENALTY FUEL LBS
A	0	0	–	–	–
A	50	0	–	:07	1430
A	100	0	–	:13	2850
B	0	50	370	:01	1140
C	0	50	245	:05	2100
D	0	100	370	:03	2810
E	0	100	245	:08	4730

HOW TO HOLD, HIGH OR LOW? Graph shows results of 100% sample of jets fed into a high-density airport. Note how acceptance rate increases as holding altitude decreases. ←

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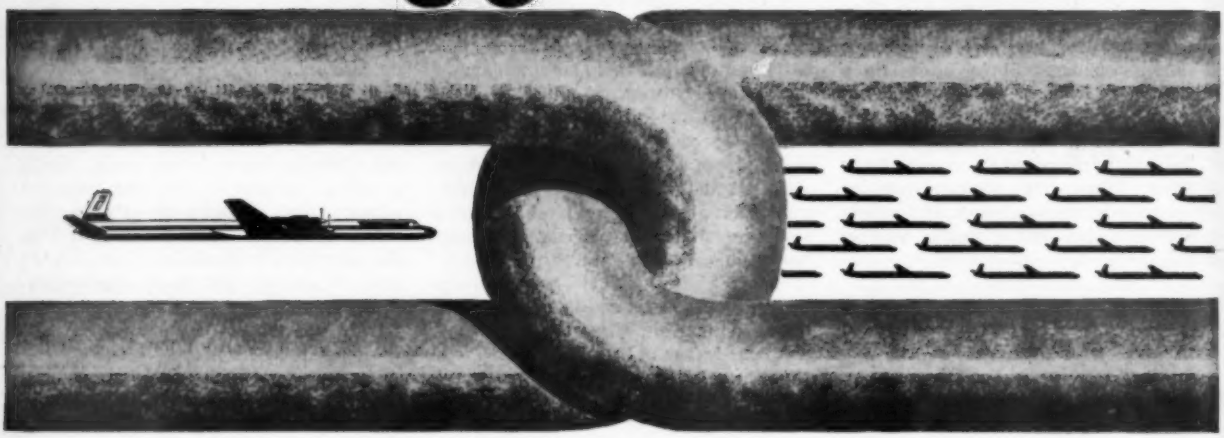

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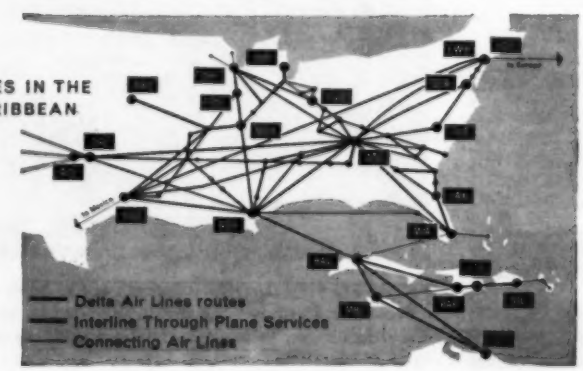


—TRANSPORT TRENDS—

There are at least two stumbling blocks in the way of Congressional action to establish a Federal Aviation Agency this year. One is red tape in the Defense Department. Air Force is anxious to get its views known on several important changes it believes are needed in the bill. But Pentagon top brass seem in no hurry to transmit these views (see next page). House Commerce Committee may also delay action. Chances are bright for Senate approval of the bill, despite some expected opposition. But the House unit is bogged down in a mire of legislation. It could move FAA to the top of the list, but thus far has shown no inclination to do so.

The used airplane market is deteriorating already. More and more transport planes are becoming available for sale. American Airlines will have 29 DC-7s and DC-7Bs on the market by July. And one airline executive says there are 100 DC-7 type aircraft that would be sold today if there was a demand. Eastern Air Lines now has 18 Lockheed Constellation 749s for sale. Asking price is about $850,000 each. An airline president says he wouldn't be surprised if some four-engined piston aircraft are scrapped eventually for lack of buyers.

Recession note: The number of bad checks written by passengers for transportation is way up, according to airline reports.

Look for many more newspaper reports of near-misses and too-close passes between airliners and military jets. Reason: increasing interest in the subject, resulting in a greater number of incidents being reported.

Sniping has started from all directions at the bill to grant permanent certificates to all-cargo airlines—once a relatively non-controversial measure. An anonymous multi-part statement—evading attempts to identify its authors—has been filed with the House Commerce Committee, outlining objections to permanent certification. It states flatly that no one has yet proved the public need for "specialized all-cargo carriers."

Outlook for passage is dimming anyway. Chairman Oren Harris (D-Ark.) is less than enthusiastic in view of cargo lines' financial troubles. An additional dilemma: the Senate bill bars subsidy for cargo carriers, but meanwhile requests for this aid have been made to CAB.

Need for tight control over use of jet fuels is underscored by one airline purchasing agent. He points out that with piston-engined aircraft, the fuel expense comprises about 15% to 18% of operating costs. With turboprops and jets this will rise to the 30%-40% bracket.

Industry might be surprised if passengers were polled on importance of speed. One airline checked several days of incoming calls for reservations, learned to its surprise that the public seemed completely disinterested in elapsed time of flights. Most frequent question concerned the various departure times available. No one asked about arrival times.

Odds favor Seattle as the meeting place of ICAO (International Civil Aviation Organization) next year.

No amendments will be made to U.S.-French bilateral air agreements—at least, not for a while. The serious government crisis in France has resulted in an indefinite suspension of informal talks which were aimed toward that end.

TRANSPORT
At Deadline

Pentagon Snag Delays FAA

Federal Aviation Agency forces last week ran into the first real slowdown when the Defense Department was unable to work out its position and asked twice for a postponement of hearings before the Senate Aviation Subcommittee. Suggestions for breaking the bottleneck were varied and even included one that would have Airways Modernization Board Chairman E. R. Quesada present the government's—military and all—views on the bill.

Supporters of the measure were balking at this solution, mostly for this reason: The new agency, to be successful must be a joint civil-military venture.

Nearly all witnesses recommended that the new agency be a real civil-military partnership. United Air Lines' W. A. Patterson declared that the airlines "can't maneuver to have an advantage over anyone else—including the military." He added that the military must be guaranteed precedence in the use of the airspace in times of emergency "even if we have to ground all commercial aircraft." Patterson said, however, that for the interests of both to be adequately protected, both must share in the decisions and duties of the agency.

The Air Transport Association's Stuart G. Tipton voiced the attitude of the rest of the nation's scheduled airlines. The airlines, he told the committee, want an agency that can make conclusive and final decisions and they want the assurance, he added, that "the military agencies are prepared to be stuck with" these decisions. He called for military participation to be extensive, active and constant enough so that they would assume some responsibility for decision.

ATA, along with the Airport Operators Council, opposed transfer of the new agency in time of war to the Defense Department. AOC's Thomas Burnard said: "If things are that bad that we have to go to a military government, then turn the civil agencies over—but not before." Tipton suggested the provision be given more study and that Congress refrain at this time from determining that the agency go military in wartime.

Tipton cautioned against splitting the safety authority between FAA and the Civil Aeronautics Board as is presently done with the Civil Aeronautics Administration. Under the current set-up, CAB makes the rules; CAA enforces them. Staff duplication, confusion, conflict of decision and delay were cited as the major evils of this practice.

"It seems likely that all regulations of any consequence issued by the new agency will be appealed to the Board, and decision will be delayed while a lengthy proceeding is carried out," Tipton declared. He urged that remedies against an arbitrary or unwise administrator be sought through the courts or the Administrative Procedures Act.

Burnard, after reminding legislators that the whole system of air traffic "begins and ends at the airport," asked that the bill clarify the new agency's responsibility for airport development. He called for improvements in airport capacity to be kept in balance with those in the airway's capacity.

Clarence N. Sayen, president, Air Line Pilots Association, advised against the ATA recommendation that CAB relinquish its safety and rule-making responsibilities. He said that the pilots want an administrator to act decisively and with authority in air safety matters, but fear that, unless the Board is given the right to review the administrator's actions, he will be reluctant to exercise his authority.

David H. Baker, president, Capital Airlines, asked by the Committee whether he saw anything incompatible in having a civilian head the new agency, replied that it shouldn't interfere with the military, provided it were amply represented in the new agency. He cautioned, however, against giving the Administrator such overall authority that he could hamper military activities. But, he added, "I see nothing in this bill that would do that today."

Here's What Industry Men Say About FAA

Stuart G. Tipton, *President of the Air Transport Association* . . . "Whatever may be said with respect to our present situation, it is perfectly plain that there must be the closest military-civil coordination as we progress toward positive control (of airspace), if military and civil interests are to be met. This coordination must be achieved through direct participation in decision, and not by committee as at present. We do not believe that we can any longer afford to have the slightest failure in coordination, if the safety and efficiency of our operations are to be maintained."

E. Thomas Burnard, *Executive Director, Airport Operators Council* . . . "We would expect also that such an agency would make possible . . . better integration of the design, construction and operation of aircraft and the environment in which they must operate—that is, a true systems planning of airplanes, airports, airways, air navigation services, communications services . . ."

W. A. Patterson, *President, United Air Lines* . . . "My principal reason in urging the early enactment of this legislation is to increase the safety of present-day air transportation and to foster its safe future development . . . (for) the passengers who travel on commercial airlines, the members of the flight crews on the scheduled airline planes, the many military pilots and the private and business pilots who are conducting flights daily over the airways of the United States."

Clarence N. Sayen, *President, Air Line Pilots Association* . . . "At the present time our airways system has failed to keep abreast of increased numbers and complexity of aircraft in the air . . . This has resulted from divided responsibilities and inadequate appropriations for many years. The legislation . . . would substantially overcome these basic shortcomings."

Dwane L. Wallace, *President, Cessna Aircraft Corp.* . . . "Any new traffic system that is adopted must allow VFR activity which [constitutes] 90% of general aviation travel . . . 'See and be seen' is not outmoded, and should be taught as diligently as instrument flight procedures . . . Essentially, all collisions have occurred in clear air with good visibility. The pilot's responsibility is obviously to look where he is going."

No Ground Navaids

GPE's new HIDAN system would make them obsolete

General Precision Equipment Corp. has introduced a device which might ultimately eliminate any controversy there may be on the subject of ground-based air navigation aids—by eliminating these aids themselves.

Called HIDAN (High Density Air Navigation), the new system is designed to permit the pilot to follow a planned flight path by means of self-contained, independent, airborne navigation equipment.

Heart of HIDAN is RADAN, a Doppler navigation system produced by General Precision Laboratory for USAF. Ground speed and drift angle information from RADAN is mixed in a computer with course and distance to destination data programmed by the pilot. Heading signals are fed to the computer from a J-4 compass system.

When HIDAN is put into action at the start of a trip, the pilot receives a running account of ground speed and drift angle. A clock shows the expected time of arrival at the programmed destination and a counter continuously gives distance left to go.

Two other counters tell how far to left or right of planned course the aircraft is if the pilot has deviated for any reason. The ETA and distance-to-go features of HIDAN allow for deviations from course in that they always show how long and how far to destination from wherever the aircraft is—even if the pilot heads on a reciprocal course.

The experimental system being flown in GPE's DC-3 makes use of the azimuth bar of a standard ILS indicator to help the pilot keep on course. The ETA clock is his only indication of whether he is flying ahead of or behind flight plan. However, the final system proposed by the company contains a grid type indicator incorporating a "floating" representation of an airplane. In addition to course and distance data, the pilot will program desired ground speed.

With this proposed system, as long as the pilot keeps the "floater" in the middle of the grid, he will be flying precisely as scheduled. If he deviates from the programmed flight plan, the "floater" will move out of the center of the grid to show actual position relative to planned position. If it should become necessary to change a flight plan, the pilot would simply reset the computer and fly by the new indications.

One of the main advantages in HIDAN is that the accuracy with which a pilot will be able to make good his flight plan will simplify air traffic control, says Edwin A. Link, GPE's president. He adds that it will result in savings by reducing delays.

Present estimate is that HIDAN will be available early in 1959. Developed with company funds, a dual installation of the new system will cost about $75,000 in initial, limited production quantities. However, the company foresees the day when various versions will be available for $3,000 to $15,000.

DMET Breakthrough

American orders Federal navaids for Boeing 707s

Long-standing silence among airlines as to their planned use of the "Tac" portion of CAA's Vortac navaid program ended abruptly when American Airlines placed a firm order for DMET (Distance Measuring Equipment-Tacan).

American's order, placed with Federal Telephone and Radio Co., division of International Telephone and Telegraph Corp., calls for airborne DMET indicators and interrogators for use in the carrier's Boeing 707 jet transports. AA estimates the two units and necessary hardware will weigh about 30 lbs.

Until the American action, there had been no indication that scheduled U.S. airlines would equip their fleets to make use of the distance-measuring element of the Vortac system now being installed throughout the U.S. Airlines last year opposed (through Air Transport Association) a U.S. position in the International Civil Aviation Organization that would have stated a civil operational requirement for Vortac including the distance-measuring feature.

Some airline industry officials take no issue with the requirement that distance-measuring capability be planned into the future U.S. air traffic control, but object to a stipulation that only DMET be considered acceptable. Feeling is that newly developed Doppler-type self-contained navaids also might supply accurate distance information and could be operated without reliance upon a network of ground facilities.

This latter point obviously would have an important bearing on airline thinking should proposed airways user charge legislation be enacted and the airlines be asked to underwrite a large share of the cost of the Vortac network.

Meanwhile, reports of declining military interest in Tacan and a shift to Doppler and inertial navaids also clouds the DMET picture. Although the military won airline support of Vortac as the "common system" navaid several years ago on the basis that certain system shortcomings could be corrected, it reportedly has since backed down on several of these "fixes" as the result of a tightening Defense budget situation.

Jet Maintenance

CAA reviewing proposals by airlines on new engines

First major action to set overhaul and maintenance limitations for airline operation of jets and turboprops is under way.

During recent talks between airlines and the Civil Aeronautics Administration, prospective operators of Lockheed Electra turboprops submitted a specific plan for overhauling and maintaining Allison Model 501-D10 turbines.

CAA officials now are reviewing industry's proposal and expect to have an answer or recommended changes before the end of the month.

Meanwhile, sessions between industry and CAA are being scheduled for the Lockheed Electra aircraft as well as other aircraft and engines. The Electra meeting will take place June 20-21, Boeing 707 June 30-July 2 and the Pratt & Whitney J57 July 10-11.

Although specific details of industry's proposal on the Allison engine were not available at presstime, it is understood to stress the "sectional" approach to overhaul as opposed to the fixed-period approach for entire piston engines in the past.

Reasoning behind the airline position is this: In the piston engine the cylinder is the key component in the compression, combustion and exhaust cycle of its operation and it historically has been the item having the most influence in limiting overhaul time. In the jet these same functions are divided among the compressor, combustor and turbine and should be treated individually when establishing overhaul periods.

For example, assuming the combustor and turbine sections would be overhauled at 1,000 hours, the cold sections, such as compressor, gear box and drive shaft, would be assigned higher periods in increments of 1,000 hours.

In order to handle the big job of establishing approved overhaul and maintenance programs for the Electra, 707 and Fairchild F-27 over the next few months, CAA has set up a system of maintenance review boards. The project is being administered by Harry A. Turnpaugh, chief, Air Carrier Maintenance branch, Office of Flight Operations and Airworthiness.

Plan is to have each maintenance review board meet with teams representing industry to arrive at specific overhaul and inspection times based on the thinking of the manufacturer who built the aircraft or engine and the carriers who will operate them. Although the initial session on the Allison engine was held in Washington, meetings with Lockheed and Boeing are scheduled for the respective plant locations.

Telephone tempest

Hector Wants Kunzig Fired for "Threatening" UAL Call

The Civil Aeronautics Board was in a turmoil last week over a demand by Member Louis J. Hector that the executive assistant to the Board chairman resign for remarks he reportedly made concerning congressional testimony of United Air Lines president W. A. Patterson on air safety.

Patterson, in testimony before the Senate Aviation Subcommittee, accused CAB of inaction and indicated that its approach to air safety problems has been a negative one.

Later, Robert A. Kunzig, executive assistant to CAB Chairman James Durfee, was reported to have telephoned United's Washington vice president Robert Ruddick and allegedly criticized Patterson's testimony.

Hector then made a motion to the Board that Kunzig be asked for his resignation. He wired Patterson that he had been "astounded" to learn of the phone call. "I expressly repudiate this action in its entirety," he said. "I do not believe in government officials trying to browbeat private citizens . . . with some of your recent statements I have strongly disagreed. Honest differences of opinion, however, are the lifeblood of democracy. It is unthinkable that any government official would try to discourage a citizen with long experience in aviation from freely expressing his views on air safety."

At presstime, there had been no action on Hector's motion. Durfee defended Kunzig, asserting that "I have never found any occasion which Mr. Kunzig's actions were not honestly motivated by both the best interests of the Board and the public interest in mind." Nevertheless, he said he would ask the Board to act on the motion as soon as Hector returned from a brief vacation.

In addition, Durfee, Vice Chairman Chan Gurney and Member G. Joseph Minetti wired Patterson that Kunzig's call was made "without knowledge of or authority from the board or any individual member thereof and did not reflect the views of the Board." Member Harmar Denny also wired Patterson that Kunzig's "unpardonable remarks do not reflect any statements made by me."

White House Looking Into Airline Economics

A thorough analysis of current airline economic conditions is being prepared for the White House by Paul Cherington, Harvard School of Business Administration air transport economics expert.

Cherington, one-time executive assistant to the chairman of the CAB, former consultant to the Air Force on air transport matters, and well-known in industry and government circles, has already met with airline executives and some manufacturers.

Airlines were queried on their equipment programs and whether they will be able to meet their commitments. Also sought were opinions on fare increases and the adequacy in 1958 of the Civil Aeronautics Act of 1938.

Some sources indicated the White House call for a report and recommendations was occasioned by growing concern over the question: With slightly under 25 billion passenger-miles flown last year, where is the traffic to be found to fill the nearly 60 billion seat-miles that will be available with completion of the jet re-equipment programs a few years hence?

President Reappoints Gurney for Full Term

The President has nominated Chan Gurney to a second six-year term on the Civil Aeronautics Board beginning next Jan. 1. A former Republican Senator from South Dakota, Gurney was first appointed to the CAB in 1951 to fill the last two years of a vacancy on the Board. He was reappointed by President Eisenhower in 1953 for a full term. In 1954 he served as chairman. Presently he is vice chairman of the Board.

The early decision by the White House to reappoint Gurney is considered a tribute to his work on the CAB. It is particularly significant in the light of his vigorous and increasingly frequent dissents from majority decisions, particularly those of the past two years involving multiple duplication of routes, and disapproval of fare increases.

Prompt approval of Gurney's nomination by the Senate is expected.

Pilots Reject AA Offer of 10% Wage Increase

Negotiations between American Airlines and Air Line Pilots Association broke down early this month despite the fact that the airline has offered its pilots a 10% raise, retroactive to August, 1957. National Mediation Board is trying to arrange more talks.

Under AA's proposal, nine-year captains flying 85 hours monthly would receive annually: on a Convair, $17,424; DC-6, $19,560; DC-7, $21,792; Lockheed Electra, $22,400; Boeing 707, $26,939.

AA said all planes to be flown during the life of the contract should be covered, including Electras and 707s. ALPA says American cannot furnish enough operational data to negotiate on the latter two planes now. AA also said talks have been clouded by ALPA's policy calling for a third pilot instead of a flight engineer. AA recently signed a five-year pact with Flight Engineers International Association.

Transport Briefs

TWA has received a $2,161,555 USAF contract to buy communications supplies to convert commercial airliners in event of an emergency. The company, largest single operator of Constellations, will buy the radio and electronic devices for all Lockheed transports in the Civil Reserve Air Fleet. It will hold the equipment in reserve in strategic areas.

Hertz Rent-a-Plane service has been inaugurated with 269 planes available.

Braniff Airways has placed orders with Collins Radio Co. for $428,000 worth of airborne communications, navigation and instrument equipment for Lockheed Electras and Boeing 707s.

Airlines ranked as six of the first 10 U.S. passenger carriers in 1957, based on revenues. American Airlines was first with $267,181,000, followed by United, Eastern and TWA. All topped the first-ranking rail line, the Pennsylvania, which had $121,740,000.

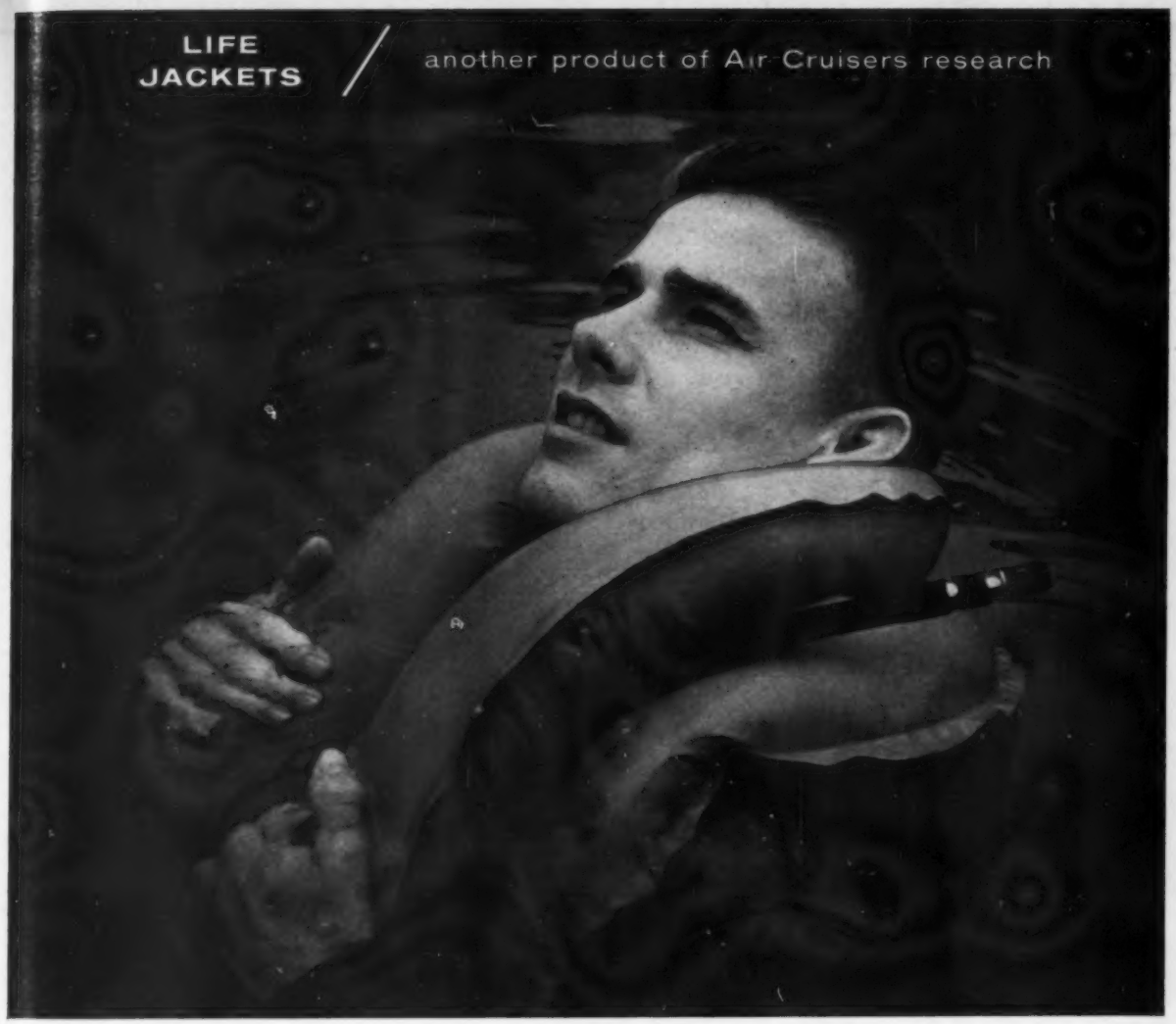
Ora W. Young, administrator of CAA's Region 1 (New York) since 1946, has been named by CAA Administrator James T. Pyle as his assistant for jet age planning. Joseph D. Blatt, regional deputy administrator since 1956, will succeed Young.

CAA will mark its 92 planes with orange daylight fluorescent paint. The light-reflecting paint will cover 15% to 20% of the aircraft and will be bordered in black.

Pacific Air Lines has increased its order for Fairchild F-27s from five to six and reached agreement for a 44-seat version of the turboprop transport. The new arrangement involves moving the forward bulkhead to accommodate 11 rows of seats.

First Fairchild F-27 turboprop will be delivered to West Coast Airlines June 22 as scheduled. Dedication ceremonies will be held at Fairchild Engine & Aircraft Corp.'s Aircraft Division. Lt. Gen. James H. Doolittle (USAF-Ret.) will be the guest speaker.

The Flying Tiger Line is installing a General Precision Laboratory Doppler Navigation Systems in a Lockheed Model 1049H for a 90-day trial period. The unit is an improved model expected to eliminate problems encountered by Pan American and TWA in previous evaluation of Doppler navigational systems.



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—LETTERS—

Well, Now . . . Thanks

For the past several years I have been keeping at my finger tips copies of the annual Air Transport edition of AMERICAN AVIATION. In my opinion, this is the most concise and complete approach to an annual status of all operating airlines. I cannot say that this year's edition is any better than last year's because improvement is well nigh impossible.

Norman H. Golden
Vice President, Maintenance & Engineering
Riddle Airlines, Inc.
Miami, Fla.

•

I have been reading the issue of AMERICAN AVIATION in which "Air Transport Facts and Figures" appears as an insert. I want to congratulate you on the fine job you have done.

The industry appreciates the fact that for nine years now you have been using "Facts and Figures" as an insert. This is especially valuable to us for the extra circulation our publication receives.

Stuart G. Tipton
President, Air Transport Association
Washington, D.C.

•

I have just finished going through the Ninth Annual Air Transport Progress Issue dated April 21 and I want to compliment you and your staff on a job well done. I think it is the best issue yet and plan to keep it in my desk for ready reference as information is needed.

John A. Collings
Senior Consultant
Trans World Airlines
Kansas City, Mo.

•

For the Record

Congratulations on a fine aircraft systems and accessories report in the March 24 issue of AMERICAN AVIATION.

However, it would be appreciated if you could correct what we feel may leave an erroneous impression created by the listing, regarding the F-27's air conditioning system in the Accessory Report—U.S. Turbine Transports on pages 24-25. The Stratos Division has complete system responsibility. Both the air and vapor cycle systems were designed and developed by Stratos. Godfrey Engineering Co., Ltd., supplies only the Roots blower which provides pressure for the cabin supercharger.

Once again, congratulations for the complete and comprehensive aircraft accessories market report.

Fred Hawkins
Public Relations Manager
Fairchild Engine Division
Fairchild Engine and Airplane Corp.
Deer Park, Long Island, N.Y.

•

Bouquet for Burkhardt

There have been so many good things in AMERICAN AVIATION that I usually take them a little for granted. However, the article by Bob Burkhardt on the General Passenger Fare Investigation in the June 2 issue was so good that I thought I would write you to tell you so. In very short copy he caught, I feel, the heart of the problem in a most devastating and effective manner.

John Hoving
Vice President-Public Relations
Air Transport Association of America
Washington, D. C.

•

About People's Factories

Your editorial entitled "Our Peoples' Factories" (April 7 issue) was a harsh, yet factual indictment of a dangerous military trend that should receive our country's top level attention. Unfortunately, many fine military officers receive this brand resulting from the action, or lack of action, by a few empire-builders.

I can speak from experience—after a lay-off with thousands of others, my A&E license has been put to work driving a truck to earn my bread. My employer, in business for many years, finally had to close his plant because the People's Factories are now doing their work.

But, to add insult to injury, the silly answer to your editorial by Navyman A. L. Arnold (May 19 issue) is about all one can stand. This answer proves beyond any doubt that the organized Government payrollee is out to perpetuate the "Commissar's Paradise." The Navy, which is the worst offender of all by far, never fails to call on its underground to fight any whisper of criticism. So, here you have a top example to receive nomination for the Order of the Red Star.

Pensacola Navyman Arnold must make the Navy proud. He never once mentioned the issues advanced in your article. Instead, he waltzes into a pipe-dream based entirely on evasive untruths, to wit:

Your editorial pointed out that only 3% of aircraft maintenance funds goes to competition. Our freeloader here suggests his "average folks" take over all the depots at "cost plus 6%"—I doubt if even Kurshchev could match this Navy spokesman. Our Air Force at least tries to work with industry but our boy Benedict puts us back where you left off.

Laurence Gleason
615 Chestnut
Southgate, Calif.

•

Grim Joke

Thank you, thank you, thank you—for your excellent editorial in the June 2 issue. One can fairly see the smoke coming out of your ears, and deservedly so.

There is a grim joke being passed around L.A. these days, by the general public—not by airlines people—to the effect that the airlines are going to fire their hostesses and hire tail gunners to stand off the Air Force.

When such a "gag" is passed around by members of the public, then awareness is here.

We need the Air Force, everybody knows that, but we most emphatically don't need the kind of aerial hot-rodding which goes on all the time with those apparently adolescent jet-jockeys. And we certainly don't need 30 to 40 deaths at a crack, either.

Gilbert L. Smith
Publicity Department
Scandinavian Airlines System, Inc.
Beverly Hills, Calif.

•

Blames Military for Crashes

The recent crashes and near-misses between military and civilian aircraft has brought about a tremendous clamor for more "Traffic Control." This is not all of the problem.

Without a completely implemented and operating air navigation system, you cannot have the degree of traffic control everyone is talking about. The effects of the Vortac decision are now being tragically demonstrated. It is a fact that the present air navigation equipment installed in military jet aircraft is not only inadequate, but completely obsolete so that they are a burden to the already over-loaded traffic

AMERICAN AVIATION offers these columns to readers for expression of opinion and criticism on the editorial content of this magazine and/or happenings in the aviation industry. Address such correspondence to Joseph S. Murphy, Executive Editor, American Aviation, 1001 Vermont Ave., Washington 5, D.C. Anonymous letters will not be printed; however, names will be withheld on request.

control system and, as has been demonstrated, a hazard to other aircraft in the sky.

Activities of the military have seriously hampered progress in air navigation and traffic control and the blame for the situation we are now in rests squarely on their shoulders.

With military-dominated agencies taking over civil functions and responsibilities, I shudder to think what we are in for in the future. We have already spent a tremendous amount of money and we are now proposing to spend additional large sums, but in reality, what and where is it getting us? Not a single Vortac station has been commissioned and Tacan is still bogged down with technical difficulties. For this we abandoned a completely implemented and operating system which could go a long way toward solving the present safety dilemma we are in today.

Cole H. Morrow
Assistant to the President
J. I. Case Company
Racine, Wis.

When & Where

JUNE

Institute of Navigation, annual meeting, U. of Calif., Santa Barbara College, Goleta, Calif., June 19-21.

Aviation Distributors & Manufacturers Assn., annual meeting, Mount Washington Hotel, Bretton Woods, N.H., June 25-27.

American Institute of Electrical Engineers, transportation conference, Statler Hotel, Buffalo, N.Y., June 25-27.

Water-Based Helicopter Symposium, Stevens Institute of Technology, Hoboken, N.J., June 27.

JULY

All-American Aviation Exposition, Pittsburgh-Connellsville Airport, so. of Pittsburgh, July 4-6.

Northeastern States Soaring Championship Contest, Elmira, N.Y., July 4-6.

Annual All-Woman Transcontinental Air Race, San Diego to Charleston, S.C., July 4-8. (For details write: Air Race, Inc., 2611 E. Spring St., Long Beach 6, Calif.)

Institute of Aeronautical Sciences, national summer meeting, Ambassador Hotel, Los Angeles, July 8-11.

National Air Races, Royal Aero Club, Baginton Airport, Coventry, England, July 10-12.

Triennial Inspection, NACA Ames Aeronautical Lab., Moffett Field, Calif., July 14-15.

Assn. of Local & Territorial Airlines, quarterly regional meeting, Denver, Colo., July 24-25.

AUGUST

National Flying Farmers Assn., convention, Hotel New Yorker, New York City, Aug. 11-15.

Experimental Aircraft Assn., annual fly-in & convention, Milwaukee, Wis., Aug. 8-10.

Institute of Radio Engineers, western electronic show & convention, Ambassador Hotel, Los Angeles, Aug. 19-22.

SEPTEMBER

Society of British Aircraft Constructors, flying display & exhibition, Farnborough, England, Sept. 1-7.

International Aviation Show, Coliseum, New York City, Sept. 6-14.

Air Freight Cartage Conference, Air Cargo, Inc., Hotel Sherman, Chicago, Sept. 9-10.

American Rocket Society, fall meeting, Hotel Statler, Detroit, Sept. 14-18.

National Business Aircraft Assn., annual meeting, Bellevue-Stratford Hotel, Philadelphia, Sept. 22-24.

Society of Automotive Engineers, aeronautic meeting, aircraft production forum, Ambassador Hotel, Los Angeles, Sept. 29-Oct. 3.

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Continental's Factory Re-manufacture plan, successor to the periodic overhaul, backs you with the specialized skills of the men who know your engine best. With your factory re-manufactured Continental, you get new engine warranty—new log book with zero hours—at a modest, pre-determined price. Most important of all, you're back in the air with an absolute minimum of costly down time.

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CAB's 'Stu' Mulligan

Secretary to Board becomes Director of Air Operations

The new director of the Civil Aeronautics Board's Bureau of Air Operations is a soft-spoken, slightly built, 48-year-old New Englander with the rockledge name of Minot Coolidge Mulligan. For reasons which every small boy will understand, he uses the abbreviation "M. C." To his friends and co-workers at the CAB he is better known as "Stu".

The job he has taken over is probably the most important staff job in the CAB. Bureau of Air Operations has the largest number of employes of any of the CAB's nine bureaus and offices; it has basic responsibility for routes, rates and international affairs. These are the heart and soul—not to mention the profits—or airline operations.

For the past 12 years Mulligan has filled the very important CAB post of Secretary to the Board and Comptroller of the agency. As the chief fiscal officer of the CAB, he has grown to know the problems of the various air carriers intimately, for he is the man who disburses the subsidy payments. This is done on Board order, of course, but even so it is a rare subsidy conference that hasn't involved Mulligan or his staff.

At the same time, every policy, every employe, every proposal of the CAB for the past 12 years has come under his watchful eye, for as secretary and comptroller, it has also been Mulligan's job to draw up the agency's budget. He has had the major task of piloting the money requests, after adoption by the Board, through the sharp-knifed Bureau of the Budget, and of helping to defend it before the appropriations committees of Congress.

Not the least of Mulligan's experience is serving under eight CAB chairmen in his 12 years. With his background he is expected to be a unifying force within his bureau. He has no immediate ideas for changes that need to be made—"As of this moment, I am not aware of any changes in organization or procedure needed," he told AMERICAN AVIATION.

But Mulligan's soft voice and disarming approach to his new job may be deceptive. The airline industry is not at all satisfied that his bureau has in the past been as helpful as it might have been in furthering the CAB's congressional mandate to "encourage and develop an air transportation system properly adapted to the present and future needs" of the Nation. If he finds this to be true, there will certainly be some changes made . . . and made quietly, efficiently and incisively, in the best Bristol fashion.

I. Nevin Palley

Palley Named Sr. V. P., Temco Aircraft Corp.

I. Nevin Palley has been promoted to senior vice president of Temco Aircraft Corp. Replacing Palley as vice president for engineering will be Robert E. Galer.

Palley joined Temco in 1954 and has directed such projects as the TT-1 primary jet trainer, the XKDT rocket target drone and the Corvus air-to-surface missile. He had previously worked with Lockheed Aircraft Corp., North American Aviation, Chance Vought and Curtiss Airplane Co.

Galer joined Temco in 1957 after a Marine Corps career. A retired brigadier-general, Galer directed the guided missiles division of Navy's Bureau of Aeronautics.

Howard W. Ostrom

Mohawk Airlines Elects New Directors, Officers

Howard W. Ostrom has been promoted to general sales manager for Mohawk Airlines. Ostrom was formerly assistant to the vice president-sales.

Mohawk has also elected two new directors, Willis V. Daugherty and Clyde W. Sorrell. Daugherty comes to Mohawk from Kelsey-Hayes Co. and Sorrell is a New York lawyer.

Frank R. Chabot, former assistant treasurer and chief accountant, has been promoted to treasurer and Ray A. Murray has become general traffic manager. Murray was former administrative assistant to the president.

Hall Retires from UAL After 40-Year Career

Seely V. Hall has retired from United Air Lines after an aviation career which began with the First Aerial Squadron of Army Signal Corps in 1917. United will retain him on a consulting basis.

After World War I, Hall barnstormed the Pacific Northwest and made the first flight up the Columbia River Gorge. He helped organize Pacific Air Transport, a predecessor of United, in 1926, and worked as a station and division manager for United at many Pacific Coast points. He has been assistant to the vice president for operations, general superintendent and western operations manager for the airline.

Hall had full charge of Pacific and Alaskan operations for United in the Air Transport Command during World War II, and was named general manager of ground services for the system in 1947. He was named assistant vice president in 1953.

Guy H. Evans

Lockheed Names Evans To Geneva Sales Post

Guy H. Evans has been appointed to direct sales in Europe, Africa and the Middle East for Lockheed Aircraft Corp. He will be stationed in Geneva, Switzerland.

Evans began his aviation career in 1935 as an aeronautical engineer with Douglas Aircraft Co. For the past 12 years, he was president of Guy H. Evans, Inc., providing administrative and technical services for 14 air carriers.

He has also served as president of Evhold, Inc., an aircraft holding company, and of Snave Imports, Inc., an aeronautical product import and sales firm. Evans has also been vice president of Arcturus Mfg. Co., a firm supplying parts to the aviation industry.

Northwest Orient Elects Larry Stewart V-P

C. L. "Larry" Stewart has been elected vice president of Northwest Orient Airlines. He has served with Northwest as assistant vice president-plans for the past five years.

Stewart began with the airline as a statistical analyst in 1944, and became an economist in 1947. He was named assistant secretary for the company in 1950.

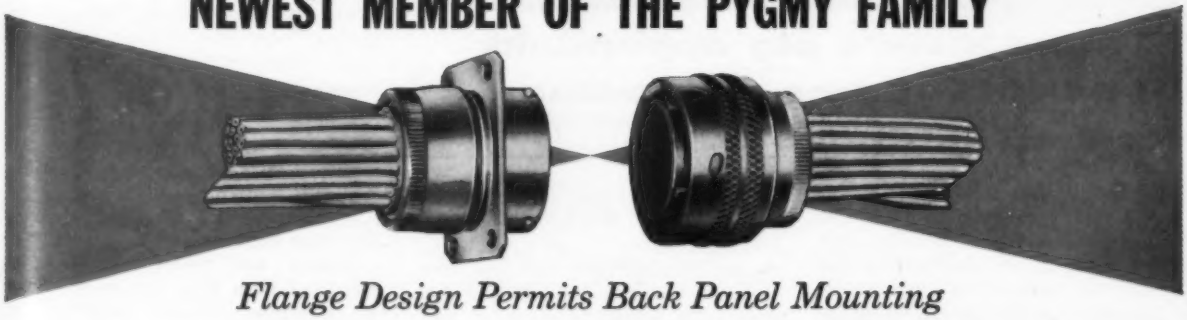
Prior to joining Northwest, Stewart

C. L. "Larry" Stuart

worked with the Federal government as an assistant economist and as a Brookings Institution staff member, where he prepared material for a series of air transportation books. Stewart majored in transportation and economics at the University of Minnesota.

(People cont'd. on page 56)

BENDIX "SP" ELECTRICAL CONNECTOR— NEWEST MEMBER OF THE PYGMY FAMILY



Flange Design Permits Back Panel Mounting

The new Bendix* "SP" connector uses an alumilite finish offering superior resistance to abrasion and corrosion. Flange size and location designed to permit back panel mounting with No. 6 screws. Other outstanding features of the new connector are similar to those of the well-known "PT" type.

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—PEOPLE—

People on the Move in . . .

Manufacturing

Vertol Aircraft Corp. has elected **Hamilton W. Lord** treasurer and **John A. O'Hara, Jr.** secretary. Lord had been controller of the company since 1952, and will continue in that job. O'Hara is former manager of Vertol's legal department and assistant secretary.

Also at Vertol, **H. Stever Tremper** has been named to manage the international division, and **Richard S. Leslie** has been appointed service department manager.

Najeeb E. Halaby has been named vice president for finance and administration and a director at Servomechanisms, Inc. He was previously vice president in charge of company development.

Arthur R. Weckel will head the newly formed field service and repair division of Sperry Gyroscope Co. Weckel is also a company vice president.

Gerard Q. Decker has been elected a vice president of Servomechanisms, Inc. He joined the firm as a division manager in 1955.

George J. Whelan, formerly with Kollsman Instrument Co., has joined the staff of Leemath, Inc. as manager, customer relations.

Selig Altschul, contributing financial editor, AMERICAN AVIATION and head of Aviation Advisory Service, New York, elected director of Polarad Electronics Corp.

Transport

Edward K. Rhatigan has been appointed director of ticket office and terminal sales services for American Airlines. Most recently director of community service planning, Rhatigan has been with American since 1940.

Walker Lee Cisler, president of Detroit Edison Co., has been elected to American Airlines' board of directors. Also at American, **Alfred B. Bowman** has been appointed eastern region manager of flight. Bowman's American Airlines career began in 1935 as a meteorologist.

D. R. "Dick" Kothe has joined Northwest Orient Airlines as direct mail and production manager for advertising. Northwest has also named **Herman O. Lindberg** as Atlanta district sales manager and **Francis G. Townsend** as assistant district sales manager in Detroit.

British Overseas Airways Corp. has named **W. D. Koster** as cargo manager. He has worked with BOAC and its predecessors since 1934, and most recently was cargo sales manager.

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EN ROUTE

by Wayne W. Parrish

Invercargill, New Zealand: The Oysters Lived Up to Advance Billing

Especially on the South Island, the Scottish influence is to be found everywhere in New Zealand.

There is a Dunedin and an Invercargill in Scotland and you'll find both cities in New Zealand.

Invercargill, in fact, is the southernmost city of New Zealand and is the farthest south of any populated area of the world except the southern tip of South America. For many years I've noted the spot on maps and decided I simply had to get there to see what sort of a place it's like. It was well worth the trip.

I was picked up early in Christchurch and driven to Harewood airport so I could take a quick run through the new National Airways Corp.'s engine and instrument overhaul base there.

Thanks to A. J. Smaill, chief maintenance engineer, I had a good tour. The shops were not all completed, but the building structure is modern and well lighted and should serve NAC's purposes well for a long time to come.

I took a DC-3 at 10:05 a.m. headed South. There are few parts of the world as tranquil and pleasant to fly over as the South Island. To the west rises the snow-covered mountain range which goes up to 12,000 feet in spots. The eastern two-thirds of the island consists chiefly of attractive plains, first the Canterbury plains in the Christchurch area, and then the Southland plains below Dunedin. There is a lot of grain grown here, but sheep farming is the big item.

• **Dunedin, a city of 70,000,** is the first stop, an hour and a half south of Christchurch, and in many respects it is a dead ringer for a city in Scotland. I got several good views from the air. An estuary runs inland quite a distance almost to the heart of the city and much of the town is built on hills. The architecture resembles Scotland and, I guess, most of the customs do, too.

The airport is a rough one to get to, because the terrain in the Dunedin section is very hilly. Fog and mist persist a lot of the time. There are efforts being made to build a new airport elsewhere; one reason being, I believe, that Viscounts cannot use the present field.

A nonstop flight from Wellington connected with mine at Dunedin so there was the usual bustle of transferring passengers. Then off on the last 50-minute hop to the end of the island.

This is a very prosperous and rich region, the Southland plains. You can sense it from the air, but it's confirmed in facts and figures. The Scots migrated to this faraway point and worked hard to turn it into as fine an agricultural land as you'll find anywhere.

Invercargill came into view and then there was the ocean and then a small island and then nothing beyond. Directly south was Antarctica. This town of 30,000 was the end of the line, farther south than Tasmania and farther south than Capetown in South Africa.

• **My friend Leo White** of Whites Aviation up in Auckland had really fixed things up for my arrival. The local radio station had a tape recorder at the airport to interview me and the two newspapers had reporters, all for the occasion of this crazy American who had satisfied his ambition to reach Invercargill.

Harold Duval-Smith, the NAC manager there, took me to town for a lunch, during which Neil Watson, deputy mayor, presented me with an honorary membership, complete with certificate and pin, in the active Southland Aero Club. Much appreciated.

Now it is most important to report that Invercargill is noted for its oysters. It is something akin to treason for anyone to say that they aren't the finest oysters in the entire world. If you've ever seen civic pride in action, they have it down there when it comes to oysters. Leo White had insisted that I sample them and had wired ahead that I preferred an oyster stew.

Well it happens that I think an oyster stew, made half with milk and half with cream, is the finest dish ever invented by mankind. Oysters are the only thing out of the sea that I can eat, except for cold shrimp dipped generously in tomato sauce. I like fried oysters but I only like oysters on the half shell when I have ample tomato sauce to dip them into. Since I have been seriously ill from oyster poisoning from allegedly fresh oysters in Europe (never again over there), I am always a little reluctant to try fresh oysters outside of Washington and New York in recognized restaurants. (If you've ever been poisoned from those bi-valves, you'll understand my caution —I would have died had I not been near medical assistance.)

But I was given to understand that I had to taste these Invercargill oysters if it killed me, and I did. And here we get into those painfully rigid customs and regulations which confound the traveler to New Zealand and Australia.

• **It seems that oysters** are served in Invercargill only in the evening. Under no circumstances would this hotel restaurant break the rules for even a visit by a crazy American, even for the deputy mayor. A rule is a rule, a custom is a custom, a regulation is a regulation, and in New Zealand no rule, custom or regulation is broken. Period.

So Mr. Duval-Smith, being an airline guy, which means he is far above par in intelligence, energy, imagination and initiative, set out to get some oysters for me. This was before my arrival. He bought a dozen at a sea food store. So he takes them to the hotel and asks that they be made into a stew for me since I prefer them that way. Horrors! Crisis! Call out the guards! An impertinent, incredible request! The menu had been made up for the day. Oysters are served at the evening meal. A stew made up specially at noon time? Heavens forbid, what an idea. The answer: no. And a firm no. Not in Invercargill are such whims catered to.

So, poor Mr. Duval-Smith, he did manage to get the hotel to provide a saucer into which he poured the oysters, and he did manage to get a slice of lemon, and I did have my oysters. And they were good oysters. I can imagine they make an extremely handsome stew, and with our good kind of tomato sauce they would be delectable. To those who are not allergic to sea food generally, as I am, I am sure Invercargill rates high on the list for its oysters, maybe even first. I'm not that good a judge. But friends and neighbors, don't ever try to get oysters at lunch time in Invercargill. It simply isn't done, you know, and the mere suggestion is likely to give somebody a heart attack.

And leave it to Leo White; he sent a telegram to me which I got somewhere during the stay in Invercargill. It read "Congratulations reaching most southern city. Too bad you don't like oysters, cod or cray, recommended Southland souvenirs, but could include lamb on hoof and chewings fescue."

• **The hospitality in Invercargill** was in contrast to the attitude of the hotel. And well it might be, because the Scots are wonderful people, and while there are others in the southland besides Scots, the good air and the prosperous agricultural land combine to make for good, if modest, living.

I was given a briefing on a most unusual feature of Invercargill, and visited several bars and hotels. This is the Licensing Trust which was established in 1944 to operate all liquor dispensing establishments. The Trust is now an elective body and all of the profits from the sale of liquor in the city go to charitable or other civic enterprises, among which is the building and operating of hotels.

There are strict drinking laws in New Zealand with a closing hour of 6 p.m. and drinking is generally looked upon as a tolerated and less-than-necessary evil. So the idea of taking the private profit out of liquor sales became very popular and now one can drink with the warm feeling that the profit is going into something worthwhile.

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Then, in 1923, after two unsuccessful trials, Macready and Kelley piloted the T-2 in the first non-stop flight across the United States. Leaving Long Island at 12:36 PM on May 2, they just managed to get off the ground due to a heavy load of gasoline. Twenty-six hours and 50 minutes later, they landed the T-2 at Rockwell Field, San Diego.

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